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ERGOT.

NOTE ON A FURTHER EXPERIMENT CARRIED OUT TO  
ASCERTAIN THE EFFECT OF THE INGESTION OF ERGOT  
BY CATTLE.

C. J. REAKES, D.V.Sc., M.R.C.V.S., and H. A. REID, F.R.C.V.S., D.V.H.

IN the issue of the *Journal* of 15th November, 1911, appears an account of an experiment conducted upon two young cattle which were dosed for a lengthy period with ergot administered in the form of the official "liquid extract." The experiment lasted for close on three months, and a considerable quantity of the drug was consumed without any appreciable effect having been observed to follow.\*

It was accordingly considered desirable, in view of the constant recurrence of so-called ergotism among cattle, and the doubt expressed

\* For particulars of the experiment see *Journal of the Department of Agriculture*, 15th November, 1911, pp. 361-363.

as to the part played by ergot in these naturally occurring cases, to carry out a further experiment by directly feeding cattle upon ergotized grass-heads. It was considered that by adopting this method, and keeping cattle under something approaching ordinary conditions, the phenomena attending ergotism might be reproduced, for it seemed incredible to suppose that ingestion of ergot in one or other form could take place with impunity, nor could a question of such importance to stockowners be allowed to rest upon the result of hitherto fruitless experiments conducted with ergot in commercial form.

After considerable difficulty a regular supply of ergotized grass-heads was obtained, two young steers, six to eight months old, were selected, and the experiment commenced on the 2nd February, 1912. The grass used was first tall fescue (*Festuca arundinacæa*) and later rye-grass (*Lolium perenne*). Much trouble was at first experienced in getting the animals to partake of the ergotized grass-heads, and for two weeks scarcely any of the material was eaten, although given mixed temptingly with oats, bran, calf-food, &c. The method ultimately adopted with success consisted of mixing the ergotized grass with finely cut-up green grass. In this form the food was readily consumed by both animals.

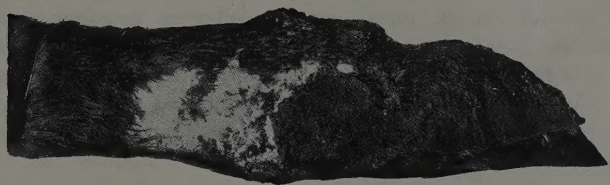
The steers were fed two or three times daily, depending upon how the feed was taken, about 1 lb. of ergotized grass being given each time, and they were kept under close observation. Needless to say both were in perfect normal health prior to being utilized for this purpose.

The first noticeable symptoms occurred in steer No. 1—the larger and older animal—on the 7th March, thirty-four days after commencing the experiment. These consisted of slight lameness in the left hind leg and the right fore leg, the corresponding fetlocks appearing somewhat swollen and painful when touched. A falling-off in condition was at the same time noticeable.

Steer No. 2 remained perfectly well, although eating with equally good appetite as No. 1. Temperatures of both animals were normal. Three days later the symptoms exhibited by No. 1 were well marked, and the animal was also freely salivating.

By the 13th March steer No. 1 was lame all round and moved with difficulty. Loss of condition had steadily gone on.

On the 22nd March the swelling affecting the left hind leg had disappeared, but the skin from the middle of the metacarpus (cannon-bone) downwards felt dry and harsh, while there appeared in that situation three abrasions which bled freely when handled. The right fore leg was still rather swollen, and when compelled to move the animal appeared to be cramped in the hind quarters.



LOWER PORTIONS OF THE LIMBS OF NO. 1 STEER. PHOTOGRAPHED IMMEDIATELY AFTER SLAUGHTER.



On the 30th March a temporary rise of temperature up to 105° F. was noted, the symptoms of lameness, &c., increasing.

On the 15th April some improvement in the condition of No. 1 appeared to have taken place, and, in order to ascertain whether wound-infection was a necessary accompaniment of ergot poisoning leading to gangrene, the abrasions on the left hind leg were intentionally infected with surface soil from the enclosure in which the animals were kept. It may be stated at once that no result followed this attempt at infection.

About the 26th April a period of very cold, wet weather set in. This appeared to greatly aggravate the condition of steer No. 1. The temperature temporarily rose to 106° F.; the animal was acutely lame, and suffered from severe constipation. The latter was combated by the administration of Epsom salts.

Steer No. 2, which up to this time had presented no abnormal symptoms, also showed a temporary rise of temperature of 105° F., and was falling off in condition. It may here be mentioned that at no period during the course of the experiment was diarrhoea ever a prominent symptom, the contrary in fact being the rule, nor were the classic inflammatory hæmorrhagic conditions recorded as affecting the visible mucous membranes ever observed.

Up to the end of April steer No. 1 became progressively worse, the right hind foot being often held up continuously. On the 15th May the claws of this foot became detached, and the other hind leg began to show signs of separation of the horn at the coronet. A week later the claws of this foot were also cast. Frosty weather followed. The fore feet began to suffer in a similar manner to the hind feet, so that the beast was forced to lie down.

On the 27th May—115 days after commencing the experiment—this steer was killed. *Post-mortem* examination disclosed only the local lesions of dry gangrene of the affected extremities, with a moderate degree of liver-congestion.

The progress of the affection in steer No. 2 was very much slower, this animal appearing to possess in a high degree a natural immunity to the action of the ergot, a point which is very frequently noticed in naturally occurring outbreaks of ergotism in herds of cattle. On the advent of cold weather, however, it too began to show the local effects of ergot poisoning, and by the 5th May was lame in the left fore leg, which was considerably swollen. Lameness appeared soon afterwards, accompanied by the usual swelling in both hind legs. The hair of the affected extremities commenced to be shed, leaving an inflamed-looking skin surface; but up to the date of writing this report no distinct gangrenous changes can be noted, though the animal continues to take its daily allowance of ergot.

Attempts were made to extend the scope of this experiment by operating on a greater number of animals, another steer and two cows which were available being also fed with the ergotized grass. In spite, however, of every method suggested to induce them to take the ergot all attempts in this direction failed. It would almost appear that these animals knew instinctively that harmful effects would follow ingestion of the contaminated fodder, and they seemed to prefer starvation rather than eat it.

It will be noted that the lesions set up by the ergot consisted solely of dry gangrene or mummification of the extremities of the limbs due to interference with the arterial-blood supply. This is set up by those contained active principles of ergot which have the properties of stimulating and contracting involuntary muscular fibre, thus diminishing the quantity of blood circulating in the arterioles and depriving the tissues supplied of their essential nourishment.

The increased severity of the symptoms during cold weather can thus readily be appreciated, cold acting as a natural adjunct to the retardive influence of ergot upon the circulation.

Lesions affecting such extremities as the ears and the tail did not occur. It should also be particularly remarked that, contrary to what usually obtains in naturally occurring cases, suppuration was at no time an accompanying symptom of the toxic changes.

#### CONCLUSIONS.

The result of the series of experiments so far conducted on the toxic properties of ergot towards cattle leads us to conclude,—

(1.) That poisoning by ingestion of ergotized grass can and does take place.

(2.) That the lesions following consist of dry gangrene of the extremities of the limbs.

(3.) That when suppuration is present it is the result of germ infection by the *Bacillus necrophorus* aided by the presence of the casually occurring *Staphylococcus pyogenes*.

(4.) That no definite inference should be drawn through failure to produce typical symptoms when utilizing official preparations of ergot, or old samples of it.

(5.) That what may be termed a classic train of symptoms may not necessarily follow.

(6.) A varying degree of insusceptibility to ergot poisoning is possessed by certain individual cattle.

(We desire to express our appreciation of the services of Mr. C. Matthews, Laboratory Attendant, who had charge of the animals during the feeding experiment, and who faithfully carried out all instructions in connection with the inquiry.)



THE FINE ROMNEY RAM, PREMIER LAD, BRED BY MR. W. PERRY, OF PENROSE.



## VACCINE THERAPY.

H. A. REID, F. R. C. V. S., D. V. H.

SOME interesting results have been obtained during the year in the application of the so-called vaccine treatment of infective disease. The principles governing this method have already been outlined in the Annual Report, 1910, in connection with contagious mammitis. Briefly, it consists of the injection under the skin of killed cultures of the organism responsible for the diseased condition. To this end it is naturally of paramount importance that the particular organism or organisms involved shall be correctly isolated from the case under treatment by bacteriological methods.

In November of the past year a particularly obstinate case presented itself for treatment. The subject was a valuable draught mare affected with sinus of the off quarter and hip discharging thick pus from seven different openings. Two smaller sinuses were also present on either side of the withers.

The sinuses of the quarter were found to be in intercommunication, and seemed to have their origin in some former injury sustained to the hip-bone. The animal had suffered in a greater or lesser degree from this condition for two years, and had finally become unworkable. Owing to the extent and deep-seated nature of the sinuses, the case was considered to be inoperable and incurable by ordinary surgical methods.

Bacteriological examination proved that infection by staphylococci was responsible for the trouble. A vaccine was accordingly prepared and treatment commenced without recourse to any other means, care, in fact, being taken to strictly avoid any other form of treatment beyond occasionally removing the external accumulated discharge with weak solution of lysol in warm water.

Starting with doses of 1,000,000,000 cocci, the dosage was gradually increased by weekly and more lately bi-weekly injections up to 4,000,000,000. Four months after commencing treatment the case remains still not completely cured, but a remarkable improvement has taken place, and there now appears every likelihood of a complete cure being effected.

In place of the seven discharging openings in the quarter and hip, only two now remain, and from these only a very small amount of

pus now exudes. The discharge from the withers ceased entirely four weeks after first commencing treatment. It is questionable as to whether the mare may ever become workably sound; but, as an illustration of the efficacy of treatment by bacterial vaccines, the case affords a good example.

*Chronic Nasal Catarrh.*—An outbreak of chronic nasal catarrh occurring among a number of foals and yearlings which has obstinately resisted the usual curative methods also came under vaccine treatment. Very successful results were obtained, and to a limited extent it was also shown that the inoculation of suitable vaccine may prove a valuable aid in preventing the occurrence of this troublesome complaint.

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### THE RURAL EXODUS: A FRENCH SCHEME.

A NOVEL way of counteracting the growing tendency of the young men of France to flock to the towns has been devised and is shortly to be put into practice, as may be seen by the following, which we take from *La Vie Agricole et Rurale*, an agricultural weekly published at Paris:—

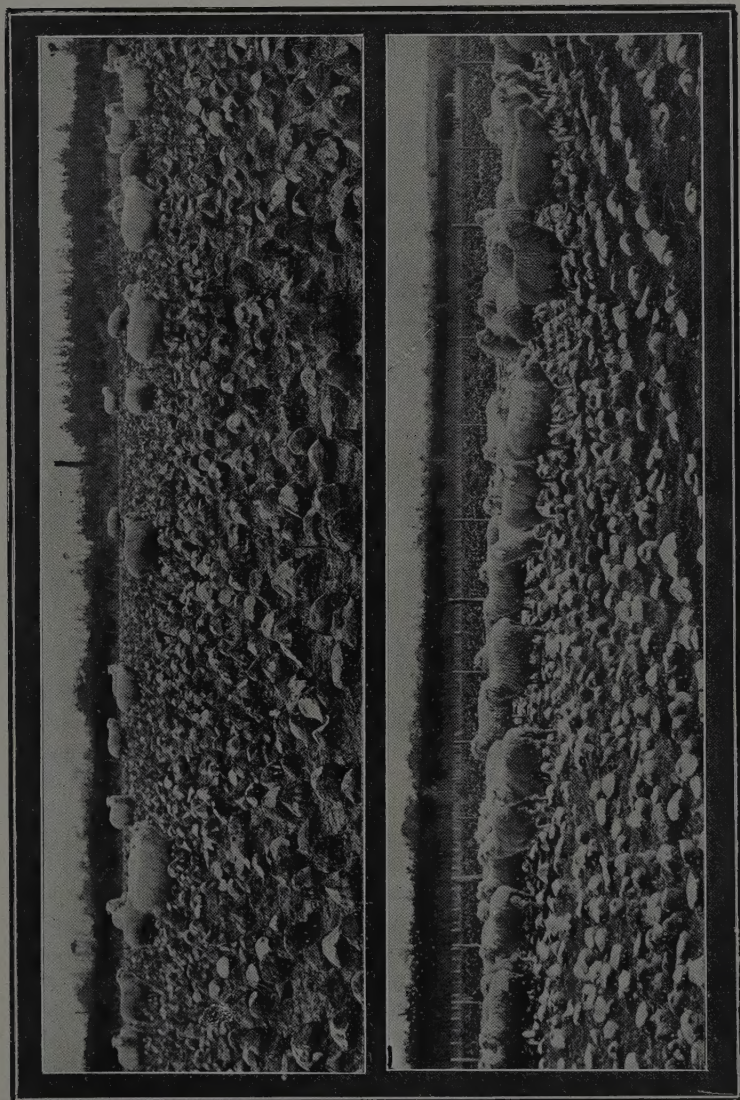
A society for giving agricultural instruction to women has just been founded by a number of people concerned at the increasing tendency on the part of young people to desert the country for the town. It aims at attracting women to agricultural and horticultural careers, hoping thereby to divert the attention to the country of young girls who now compete in too great numbers for entrance into the Civil Service, and, as a consequent result, to retain on the farm young men who now turn their back on it. The society will thus open new careers for young girls in which they will find an opportunity to follow a healthy and remunerative calling.

In order to enable these young girls to take up agricultural occupations with a surety of success the society will create schools of horticulture for women, such as exist—and flourish—in other countries. These schools will be attended not only by young girls who are going to follow the trade of gardener, &c., for a living, but also by daughters of landed proprietors, who will attend in order to gain the necessary knowledge that will enable them to cultivate their own farms or to supervise the working of these.

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*Foot-and-mouth Disease.*—By the last mail Mr. Alexander Crabb, M.R.C.V.S., the London Veterinary officer of the Department, forwarded a copy of the report of the departmental committee set up to inquire into foot-and-mouth disease. The principal recommendations of the committee are as follows: Prohibition of importation of calves with skins on; sterilization of imported hides; scientific committee in India to study the disease; and suggestions as to appointment of veterinary officers under the Disease of Animals Act.





EATING OFF THE MANGEL AND TURNIP CROPS AT WERAROA EXPERIMENTAL FARM.

## THE RUAKURA MANGEL CROP.

PRIMROSE MCCONNELL.

IN writing this report and all other reports from this farm I wish to make it very plain that recommendations I may venture to make are, generally speaking, suitable only for those farming under similar conditions, although certain rules of good cultivation may be applied in any part of the world. The South Island farmer is working under different conditions as to climate, and must alter his farming programme accordingly. In comparison with the North Island the dates of the different farm operations are much later in the South, where, generally speaking, the soil is much richer. Altogether it is very necessary for South Island farmers when discussing reports from this farm to keep the above facts in their mind's eye.

During the past few years the mangel crop has come much into favour, particularly in localities where root crops are grown for spring and early summer feed. Swedes have become an uncertain crop on account of their many natural enemies, while as yet mangel crops are fairly free from disease. Although at this farm (Ruakura) mangels have suffered much this season from the disease *Rhizoctonia*, I do not think this need cause much alarm, as it is nothing new, and the past season was exceptionally favourable for its development, being comparatively sunless and wet. The mangel is a plant that revels in sun and resists drought much better than the swede. The soil on which the mangel crop was grown is also of such a nature as might be expected to encourage such diseases as the above.

For dairy-farm purposes the mangel is infinitely superior to the swede, and may be expected to yield one-third more in weight per acre. When stored it will keep into summer, a great point in its favour. On the other hand, I have never been able to grow swedes in New Zealand that will keep long after being pulled and stored. For breeding-ewes the mangel has no equal, particularly when the lambing season occurs at a date when there is little or no grass.

It must be admitted that this crop costs more than a swede crop; on the other hand, it has many merits which the swede does not possess, and which more than repay the extra cost.

During the past season 14 acres of this farm have been devoted to the mangel crop, and, roughly speaking, the crop from 4 acres will be fed to dairy cows and 10 acres to breeding-ewes—studs and crossbreds. Now, seeing that we have a very early lambing season (at the date of writing, 20th July, more than half of the ewes have lambed), it is essential that we have some crop other than grass that will give a good milk-yield and keep the lambs in a continuously improving condition. It is expected that many of the lambs will go fat to the early market at an enhanced price; and, should nothing unforeseen occur, practically every lamb should be off hands by the end of the year, the dams following shortly after. Every sheep-breeder knows, especially the fat-lamb breeder, that the secret of success lies in being able to prevent the lambs from receiving a severe setback through shortage of feed, for if this occurs the lambs take a long time to recover lost ground. An early rape crop should also be available in November, and in the North Island I think this is quite possible. In getting the lambs off hand at an early date not only are a number of them sold at an enhanced price but the grass they would consume during summer is available for other stock, and two profits are thus reaped instead of one. When extra feed is not available at and after an early lambing season it often means that the majority of lambs are left on hand until weaning time and are sold as stores, at several shillings less per head than the fat price, from which reduced price must be taken the cost of keep during the summer months. Also, the lambs, being low in condition, cannot resist attacks of internal parasites; and, in certain localities, may succumb during the autumn.

My object in making the above statement is to demonstrate that men farming on similar lines, and under similar circumstances generally, will considerably increase the profit on the breeding flock by growing a liberal area of mangels; also, that we at this farm by growing 10 acres of mangels expect to increase our profits on the ewe flock by at least £250, less the cost of producing the mangels. I am estimating that the difference between the early fat lamb and store price, plus the saving of summer feed, will amount to at least 5s. per head, and 1,000 lambs at 5s. is £250. In fact, I think 5s. is considerably under the mark, for if extra feed were not available at this critical period fewer ewes would of necessity be kept longer on the farm, and this would still further reduce the money return from store lambs. Of course, I am aware that all sheep-breeders are not in a position to grow mangels; but I feel sure that all who are farming on lines similar to those obtaining here and who have not yet given this crop a trial would do well to do so.



A further advantage mangels have over swedes for the purpose under discussion is that they must be stored; for, although this means an outlay of money, it is more than balanced by the fact that the land is available for ploughing at a comparatively early date, and this goes a long way towards securing the success of the following crop. On the contrary, the swede crop is, as a rule, fed on the land where it grows without storing, and in many cases it pays best to do so; but under such conditions the land is often ploughed too late to temper, which tempering is all the more necessary seeing that the land is often badly poached by allowing the stock to remain on the crop during periods of very wet weather, and when ploughed after such treatment the cost of preparing a good tilth is much increased and the success of the following crop is very doubtful. Only the other day I saw a large number of cows on a paddock of swedes, and although I am not going to persuade any one to believe that the cows had actually to swim in order to get from one part of the paddock to the other, it is at least a fact that the whole paddock was a veritable bog-hole and seven-eighths of it was under water. I contend that any benefits the cows may have received from the consumption of the crop were more than discounted by the certain loss from coming crops as a result of such misuse of the soil.

I am aware that the labour necessary to deal with a big crop of mangels is in some instances not to be had, and in such cases mangel-growing on a large scale is impossible; but I wish to emphasize the fact that 5 acres thoroughly cultivated and judiciously manured will grow more mangels than 20 acres badly cultivated, and even such a small area will produce an enormous amount of excellent food.

On sheep-farms where fat lambs are not produced and where lambing takes place much later in the season the case may be met by a good crop of early rape. In storing mangels I have found it the cheapest system to chop off the leaves with a sharp hoe—a man will do  $2\frac{1}{2}$  acres a day—and then run the chain harrows over, which process will uproot all mangels of the Tankard or Globe variety. In carrying out this work I have found the inexperience of the North Island farm hand a greater drawback than the scarcity of labour, for the average farm hand in the North Island has not had experience of much of the work that is necessary in intensive cultivation; and this fact adds to the cost of production.

The paddock in which the mangel crop was grown had previously been down several years in pasture, and at the date of ploughing nine-tenths of the herbage consisted of inferior grasses. The presence of such an enormous quantity of the latter, and the fact that the

season was exceptionally wet, rendered clean cultivation impossible, although the crop was horse-hoed eight times during the summer.

The following is a history of the preparatory cultivation: May, skim-ploughed and rolled; July, ploughed with digger 9 in. deep; August, twice tine-harrowed; September, cross disc-ploughed 10 in. deep, tine-harrowed and Cambridge-rolled; October, 5-10, seed and manure sown with the double ridger in rows 27 in. apart. 6 lb. of seed per acre was sown, and the plants were singled out by the hand-hoe to a distance of 9 in. to 12 in. apart in the rows. The whole crop was stored in A-shaped clamps during May and June. Previous to the last ploughing a strip 1 acre in extent, right across the paddock, was dressed with 9 cwt. of carbonate of lime mixed with  $1\frac{1}{4}$  gallons of crude carboic acid as a disease-preventive, but without any appreciable effect.

The disease *Rhizoctonia* was first noticed in the beginning of January, and it occurred in patches over the whole paddock, but was undoubtedly worst in the lowest and most swampy portions. The different manures did not seem to have any effect in increasing or preventing the disease. In September the whole paddock, with the exception of a check plot, was cross-dressed with salt at the rate of 3 cwt. per acre. This dressing had no appreciable effect in the yield. My own experience is that mangels respond more readily to a dressing of kainit than to a dressing of salt and sulphate of potash applied separately. The manurial plots (1 acre each in extent) were all affected in spots with the disease, and on this account it was impossible to get at the weight per acre by weighing unless the whole crop had been weighed, and this was not practicable. Approximately the yield per acre would vary from 30 tons in the case of plot 1 to 50 tons in the case of plot 8. The unmanured plot was practically a failure.

The following gives the manurial plots in ascending order of merit: Plot 1—Basic slag, 4 cwt.; sulphate of potash, 80 lb.; sulphate of ammonia, 80 lb. Approximate yield, 30 tons. Plot 2—Basic slag, 4 cwt.; sulphate of potash, 80 lb. Approximate yield, 35 tons. Plot 3—Basic superphosphate, 5 cwt. Approximate yield, 38 tons. Plot 4—Basic superphosphate, 4 cwt.; sulphate of potash, 80 lb.; sulphate of ammonia, 80 lb. Approximate yield, 40 tons. Plot 5—Basic superphosphate, 4 cwt.; sulphate of potash, 80 lb. Approximate yield, 45 tons. Plot 6—Basic slag, 2 cwt.; bonedust, 2 cwt.; sulphate of ammonia, 80 lb. Approximate yield, 45 tons. Plot 7—Malden Island guano, 4 cwt.; sulphate of potash, 80 lb. Approximate yield, 48 tons per acre. Plot 8—Basic slag, 2 cwt.; bonedust, 2 cwt.; sulphate of potash, 80 lb. Approximate yield, 50 tons.

It will be seen from the above that in every case the application of sulphate of ammonia reduced the yield, while sulphate of potash invariably increased it. The cross-dressing of lime did not have the expected result in the way of stimulating the action of the sulphate of ammonia. I have no hesitation in stating that a much heavier quantity of manure per acre would have paid handsomely, and, taking the season and soil into consideration, the crop may be considered satisfactory, especially seeing that many crops which received indifferent treatment were an entire failure.

With reference to the hoeing of mangels and similar crops, we farmers are still looking for an efficient horse-hoe, an adjustable one-horse implement that will hoe two rows 14 in. to 30 in. wide, such as is often seen in many parts of Great Britain. At present the market is flooded with American one-row hoes, which, in my opinion, are not effective farm implements.

The following shows the results of the variety test, the names being given in descending order of merit. All varieties were so patched with disease that it is impossible to give anything like the approximate weight per acre: Red Windsor; Selected Yellow Globe; Golden Tankard; Crimson Tankard; Giant Yellow Globe; Sugar White; Sugar Rose; Prizetaker; Champion; Yellow Intermediate; Half Long Red; Long Red; Jersey Queen; Prizewinner.

No variety completely resisted the disease; it was undoubtedly more a matter of soil and season. A selection of disease-resisting roots from several varieties has been made, and these will be grown on for seed. Prizewinner was undoubtedly at the top as to weight per acre, with Jersey Queen a close second.

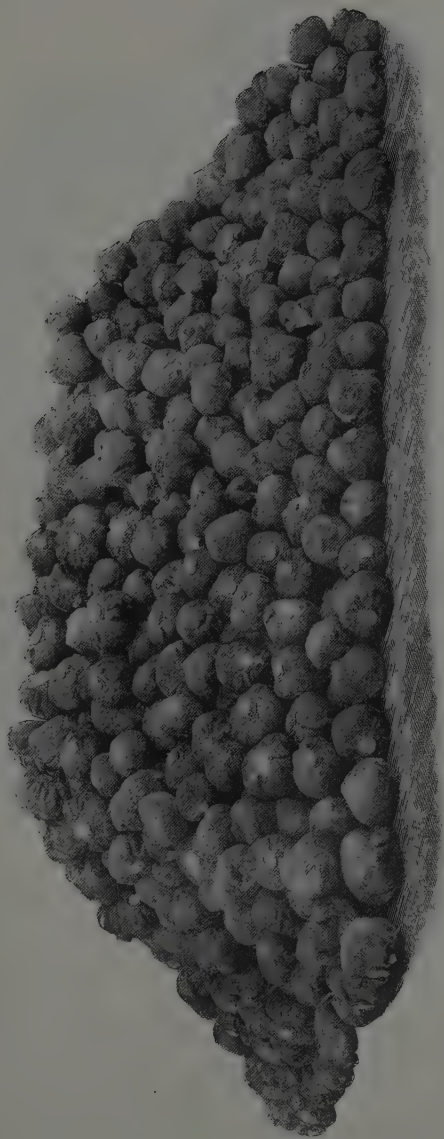
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Perfect agriculture is the true foundation of trade and industry—it is the foundation of the riches of the States.—*Baron von Liebig.*

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According to the United States Daily Consular and Trade Reports, a recent law provides for the establishment of six agricultural experiment stations in various parts of Uruguay, in addition to a practical dairy farm and a station for poultry-raising. The law empowers the expropriation, for the use of each of the six experimental stations, of an area of land not exceeding 2,500 acres and provides £4,300 for salaries and general expenses at each station, and a maximum sum of £172,000 for the expenses of expropriation, construction, and equipment.





THE NEW EMPIRE SWEDE, PREPARED FOR CLAMPING.

## TURNIP-CULTIVATION.

### A WERAROA EXPERIMENT.

J. DRYSDALE.

At the Weraroa Experimental Farm special importance has always been attached to the cultivation of roots as supplementary food for stock. The soil—a rich friable loam—lends itself admirably to such crops. While a large area of roots is annually required in connection with the farm economy, experiments are periodically conducted to test varieties that are offered to the farmer, as well as to demonstrate the best manurial treatment and management for the environment. The crops this year have proved very successful, and the experiments conducted have conveyed several important lessons. The season has not been a favourable one for the cultivation of roots, largely by reason of the continued stormy weather which prevailed during the early stages of growth. This quite prevented a proper system of after-cultivation, and thus allowed the weeds to make headway. The soil also became sodden, so that only the strongest plants survived. These disadvantages had not the prejudicial effect on the crop one might have supposed. This was largely due to the thorough cultivation the ground received prior to planting, and to the fact that six weeks before the seed was sown lime and a portion of the manure was applied, thus counteracting the natural acidity of the land and ensuring immediately available plant food for the seed. The effect of this thorough preparation of the seed-bed is now plainly evident, for, notwithstanding the impossibility of effective after-cultivation, the crop is a splendid one—in fact, one of the best that has been produced on this farm, even including those grown when virgin soil was available.

The land on which the swede tests were conducted was ploughed the previous year from lea. It was then sown, part in wheat, part in oats, and part in potatoes. Subsequently a catch crop of barley and tares was grown. After this crop was partly fed off a further growth was ploughed in about the month of August, and the land was disced and harrowed in September. At this time  $2\frac{1}{2}$  cwt. of lime with  $1\frac{1}{2}$  cwt. of basic slag was sown with a broad-cast drill on all but 1 chain wide running the full length of the field, a distance of



THE NEW EMPIRE SWEDE, AS GROWN AT WERAROA.



20 chains. At the end of October the final cultivation was given, and sowing was commenced in the first week of November. The seed was sown with a ridging-drill,  $1\frac{1}{2}$  cwt. of superphosphate being sown with the seed. This manure was applied over the whole of the field, including the strip of a chain wide which did not receive the lime or slag. While an excellent growth resulted from the soil which received basic slag and lime six weeks before sowing, the growth on the land which only received superphosphate with the seed was poor and patchy—in fact, was a distinct failure. This chain strip, by the way, was a fair sample of the soil of the whole field.

The most prominent variety of the swedes was the New Empire. This root is illustrated on the following pages. It is a well-shaped and well-textured tuber. At Weraroa it has proved a great cropper, the yield in these tests being estimated at 70 tons to the acre. There was no appearance whatever in the variety of blight or other disease. The next best variety was Magnum Bonum, the yield from which was calculated at 55 tons to the acre.

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## REFRACTORY SOILS.

### A LESSON FROM ONEKAKA.

G. DE S. BAYLIS.

BEYOND the fence in the accompanying picture is seen the land which in its natural state produces stunted ti-tree and rushes. Inside the fence is the "no-manure plot," which has been ploughed, cultivated, and sown down, but is still practically as bare as the day it was sown.

To the left is seen a corner of the land which has been manured, and is now covered with a good sward of grasses and clovers. The ragged boundary of the plot proves that wherever fertilizers have drifted the grasses speedily established themselves. As a result of this experiment the owner is putting into grass some fifty acres or so this season.





THE SWEDE CROP AT WERABOA : TYPICAL ROWS OF THE NEW EMPIRE VARIETY.

## BUSH SICKNESS.

### PROGRESS OF INVESTIGATION.

C. J. REAKES, D.V.Sc., M.R.C.V.S.

THIS investigation has been carried out steadily and systematically during the year, and a very decided advance has been made in our knowledge of the condition. All the evidence gathered points to the condition being one of malnutrition rather than of disease, properly speaking, and I have therefore adopted the term "bush sickness" in connection with it, instead of "bush disease" as heretofore. Mr. B. C. Aston, F.I.C., Agricultural Chemist, has been closely associated with me throughout, as has also Mr. H. A. Reid, F.R.C.V.S., the latter especially in connection with the pathological side of the work, while Mr. J. Kerrigan, M.R.C.V.S., Veterinary Supervisor, who took up his residence at Rotorua in July last, has since personally supervised the experimental work, giving it close and careful attention. Considerable assistance was also rendered by Mr. R. Alexander, Inspector of Stock for the district, whose knowledge, both of the affected country and of the so-called "disease," has proved of great value. In last year's report I stated that a series of experiments on the lines of applying various soil dressings to selected plots had been commenced. Some of these experiments have been concluded, but others, where good results have been obtained, are still in progress. In view of the evident obscurity and complexity of the problem to be solved, it was realized from the beginning that if a successful ultimate result was to be hoped for the work must be carried out carefully and systematically, even though involving an apparently long period of time. Thus, certain experiments which commenced in January of last year are still in progress, and will in all probability continue for some months to come, the animals concerned in them still remaining in good health—a most satisfactory state of affairs. Mr. Aston has carried out a large mass of further work in the analyses of soils, herbage, water, the urine, blood, internal organs, bones, and other tissues of affected animals, together with comparative analyses of similar material from outside districts. Mr. Kerrigan, being on the spot, has been able to make careful observations, and *post-mortem* examinations of affected animals; while Mr. Reid, at



the Wallaceville Laboratory, has conducted further feeding experiments and pathological examinations of animal specimens.

The year's work has resulted in a valuable line for further research having been opened up—viz., that a deficiency of available iron is probably responsible for the trouble—and though it would be premature yet to affirm certainty on this point, it certainly looks most promising. In any case the field of investigation has now been narrowed down considerably, and I consider the outlook particularly hopeful. Mr. Aston has furnished a valuable report concerning his work.

Those soil-dressing experiments which have given good results may be summarized as follows:—

(a.) Three young cattle (steers) brought in from healthy country were placed on a top-dressed paddock of 4 acres which had been fenced off from a large paddock. Outside the 4-acre enclosure, on exactly similar pasture (but with no top-dressing), and exactly similar land, three other young steers of the same age and same class, and brought from the same outside district, were placed.

These three outside animals all became affected, one having shown the first symptoms of sickness five months after being placed on the "sick" country, another seven months, and the third ten months after. All of these three animals are now dead of bush sickness, while the three grazing on the treated paddock are still in perfect health, and are growing and developing in a normal and natural manner, though they have been there over fifteen months. Moreover, almost from the beginning of this experiment these three animals on the treated paddock did better, both as regards their growth and development and their condition, than did the three on the untreated land even before these began to show indications of bush sickness.

(b.) Three four-tooth ewes in lamb were placed on a paddock at Lichfield which had been ploughed and sown down, and afterwards top-dressed with a different dressing to that used in the last-mentioned experiment. At the same time five other four-tooth ewes, also in lamb, were placed on an adjoining grass paddock with no top-dressing, the soil-conditions being exactly similar. All the ewes lambed in due course. Now, two of the outside ewes and the whole of the lambs on the untreated paddock are dead of bush sickness; of those on the treated paddock, all the ewes are healthy, as are two of the lambs. The third lamb lately died of bush sickness, but this lamb lasted out much longer than did the outside lambs. It may be that a second application of this soil dressing on this paddock will put it right for keeping lambs healthy as well as sheep. In any case, all the lambs could have been

got off as fat lambs before the one which died commenced to show any symptoms of sickness.

Another experiment with a similar dressing was carried out in a bush paddock, two sheep and a young steer being placed on it. Unfortunately, one of these sheep was killed by accident. The remaining sheep and the steer, which have been on the paddock for seventeen months, are still alive, healthy, and doing well.

(c.) Two small paddocks in the bush were ploughed, manured, and sown down. Three young steers and three ewes were placed on these. The steers have now been on the property for twelve months, and are in splendid health and prime condition. The ewes and their lambs are healthy and in good condition. These animals were on untreated land for about two months before going on the manured paddocks. They arrived on the property a year ago.

All the experimental animals were bred and were purchased from country at a distance, far from the area affected with bush sickness.

Though these results are most encouraging, they cannot yet be considered finally conclusive. Spring is the season when trouble most frequently occurs, and I am anxious to see what happens to these animals when that period arrives. The knowledge so far gained, however, is sufficient to justify an opinion that by the judicious treatment of the soil stock can be kept in health for a much longer period than when the land is not treated at all, and that with suitable soil-dressings and good management store stock can be fattened and got into good marketable condition.

In connection with the investigation, one experiment carried out at the Wallaceville Laboratory consisted of dosing two well-grown lambs with silica in the form of sodium silicate in solution. They have now received this daily for over four months, but have remained in good health throughout.

Further work requires to be carried out on a larger scale, and I now recommend that a small experimental and demonstration farm be established in one of the worst parts of the affected area.\* This will not only furnish facilities for better and more comprehensive work on our part, but will also enable the settlers in the district to obtain much useful practical information. With the knowledge already acquired I am of opinion that this farm will pay its way, and not involve any charge upon the revenue of the Dominion.

\* This has since been approved.

## THE CHEMISTRY OF BUSH SICKNESS.\*

B. C. ASTON, F.I.C., F.C.S.

THE soils of the area in which "bush sickness" always in time develops are composed of air-borne pumice—an acid lava which has been so mixed with gases in the molten state that on cooling it presents a spongy structure with the hardness of rock. The size of the particles that go to make up the soil is such that generally they may be classed as coarse sands. This type of country is noted for the absence of surface creeks and pools, the drainage being excellent and very rapid. Where streams occasionally occur, they have eroded deep beds or gorges through the easily-transported pumice. There is no record of bush sickness having developed on any save pumice country. From its very nature it will be admitted that pumice soils must be exceptionally well aerated, and those changes going on in the soil which benefit by an excess of oxygen here have optimum conditions under which they may take place. Analyses of pumice show that it contains every mineral nutrient necessary for plant-food, but, although these constituents are present in considerable amounts, some of them are not always present in a readily available state to the extent usually found in fertile soils.

The worst-affected country until recently supported a heavy growth of forest (see illustration, *Agricultural Journal*, Vol. iv, No. 5, p. 375), although a large area of land on which sheep cannot be successfully reared has never supported forest and has been laid down in English grasses for over thirty years. When the forest is felled and burnt much of the organic matter in the soil is also destroyed; the soil is now, moreover, subject to the action of the timber-ash, which is alkaline, and contains both potash and lime. These pumice soils suffer from two very great defects. When they were comparatively recently—geologically speaking—ejected from the bowels of the earth in a hot condition, they naturally contained no organic matter, neither did they contain colloidal clay, and although showers of mud and fire debris may at various times have fallen, they did not fall so as to form, with the coarse sands here spoken of, a more perfect mechanical

\* Previous articles on this subject by the writer are to be found in the *Journal of the Department of Agriculture*, Vol. iii, 1911, p. 394, and *Transactions of the New Zealand Institute*, Vol. 44, 1912, p. 288, and in *Dominion Laboratory Report*, 1911.

mixture of coarse and fine particles. To fill the soil-interstices it is not practicable to apply clay, but if a vegetable covering can be maintained for some years the accumulation of humus to a great degree remedies the mechanical defect. The humus acts as a solvent of plant-food, and assists the decay of the pumice rock *in situ* without the intervention of surface running water, usually necessary for the formation of soils from the parent rock. I have previously pointed out (*Agricultural Journal*, Vol. iv, No. 5, p. 377) one of the chief ways of improving unproductive pumice soils is by increasing the humus, and, as the conditions for the growth of clovers are extremely favourable, the growth of these and similar humus-producing plants must be an important factor in any system of soil-treatment adopted. On ploughable lands green-manuring with leguminous crops may prove of great service in hastening the accumulation of humus.

Turning to the chemistry of the soils, analyses of these from affected areas show that available phosphoric acid, extracted by 1-per-cent. citric-acid solutions, is generally low in amount, suggesting that dressing



BUSH-SICK BEAST.

the land with phosphatic fertilizers would prove beneficial to the pasture and profitable to the farmer\*; but it is not to be thought that lack of phosphate is the immediate cause of the sickness, as there are many soils with just as little phosphate, on which the animals remain healthy. Moreover, the bones—the chief repository of phosphates in the animal—show no signs of malnutrition. If phosphatic manures, containing no iron when applied to the land, enable stock

\* That this is true is well shown by the illustration in the last number of this *Journal* No. 1, Vol. 5, p. 26.



depastured thereon to remain healthy continuously, it is probably due to some beneficial indirect action exerted by the phosphates. What this indirect action may be is not at present clear, though it may be said that phosphates are known to have a good effect in mitigating the injurious effects of manganese compounds when present in excess. Lime, it is interesting to note, has the opposite effect,\* and there is some evidence that lime has an injurious action on the feeding quality



HEALTHY BEASTS ON TREATED PASTURE.

of pasture on "bush-sick" lands. Should further experiments confirm this, it will be one of the most remarkable facts elucidated in this research, considering the small amount of lime already present in the soil. The effect of manganese compounds on plant-life is one of the puzzles of agricultural chemistry. Analyses of the affected soils and grass from them have shown that manganese is present in amounts greater than in ordinary soils and grasses. It may be detected in aqueous extracts, filtered through porcelain, and in citric-acid extracts ("available plant-food") of pumice soils in very variable amounts. The oxidation of manganese compounds to higher and more toxic states in these well-aerated soils is a matter not to be lost sight of. About eight years ago I made analyses of sick animals' blood, and found it extremely deficient in iron. Subsequent tests confirmed that analysis; this, together with analyses of soils and grasses, hinted that a deficiency of assimilable iron in the food might be the cause of the sickness. This suggested the application of iron compounds to the soil as a possible remedy. When therefore asked to suggest a series of schemes

\* Kelly, "The Functions and Distribution of Manganese in Plants and Soils," Bull. No. 26, Hawaii Exp. Stn., 1912; also Guthrie and Cohen, *Ag. Gazette, N.S.W.*, pp. 125 and 435, 1910.

for top-dressing the pastures of the affected country, iron-sulphate was recommended by me for two farms situated widely apart. It is significant that of all the substances experimented with, iron-sulphate applied alone to pasture has been the most successful in enabling sheep (the animal most susceptible to the sickness) to be kept healthy over a period of eighteen months.\* The ewes on the iron-dressed paullock on one farm successfully reared their lambs, with the death of only one, and at the time of shearing the lot were in excellent condition, being, in fact, the best of fifteen lots on four different farms, each lot having been pastured on an area receiving a dressing differing from the above, with one exception: this was the other iron-dressed paddock. Here one of two wether sheep died as the result of an accident; the remaining animal still survives in good condition. On the control (i.e., the untreated) paddocks of these farms, all the sheep became affected, except on one farm on which six wether sheep remained perfectly healthy when grazed on a field of 300 acres, including some standing bush. It is possible that they were able, with their considerable range of food, to exercise some selection in their diet. Assuming that the sickness is caused by the deficiency of assimilable iron in the food, it would seem reasonable that in this large area there would be some vegetation not so deficient, which the animal might instinctively prefer.

#### SUMMARY.†

A great advance in our knowledge of the anæmic condition of stock known as bush sickness, occurring on the pumice lands of the North Island, has been made during the past year. For the first time have been instituted, under the direction of Mr. Reakes, Director of the Live-stock and Meat Division, field experiments in which the pasture has been treated with various substances suggested by chemical theory. Generally speaking, the effect of the dressed pasture on the animals has been most beneficial, the animals having fattened to the "prime" condition, whereas on untreated adjacent paddocks the animals have either died or become affected. Soluble iron salts proved

\* This is the more remarkable as, of the substances tried—phosphates, lime, potash, nitrates, and iron-sulphate—the last is the one which would possibly not have been thought of had the analyses not suggested it. The opinions generally expressed by authorities are not favourable to the use of iron-sulphate as a manure. Although essential to plant-growth, iron is required in such minute quantity that all soils are thought to contain sufficient. When iron-sulphate proves beneficial the result is generally regarded as due to an indirect action and not to the supply of the plant-food, iron.

† Should future research establish the "iron starvation" hypothesis as a theory, it will open a most interesting field for experiment as to the cheapest method by which the remedy may be applied. Iron-sulphate is not produced in New Zealand, but there are large deposits of hydrated iron ore at Collingwood, and a use might be found for Taranaki ironsand. Practical considerations, however, rather suggest a phosphatic fertilizer containing a large amount of iron as being the most probable remedy.

the most beneficial, and were almost entirely successful in enabling the stock to be kept healthy. Phosphates have been especially successful in the case of cattle. As the experiments are still in progress, no advice can yet be given as to the treatment of these affected lands; and, although this must be considered a progress report merely, it may be said that the bulk of the evidence at present points to a lack of assimilable iron in the food-supply as being the cause of the sickness, though the presence of an excess of manganese may be a factor affecting the deficiency.

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The sum of £2,561,000 is provided in the Austrian Budget of 1912 for expenditure on agriculture, as compared with £2,473,000 in 1911.

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A society called the " Guild of the Daughters of Ceres " has been formed in England to forward the interests of women engaged in agriculture and horticulture.

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Lord Strathcona, an old Lord Rector of the Aberdeen University, has endowed the new Chair of Agriculture at that University with a gift of £10,000.

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A sum of £5,000 has been voted by the American House of Assembly for further investigation into the natural and artificial sources of the supply of fertilizing-material and farm manures.

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In Norway a certain number of farmers are nominated " growers of the seed," and an expert is engaged to instruct them in the cultivation of improved seeds and to supervise their work.

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A report in the *Board of Trade Journal*, 8th February, 1912, states that an expenditure of £10,000 is authorized by the Brazilian Budget for 1912 for the establishment of an experimental wheat-growing area in the State of Rio Grande do Sul.

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Cambridge University has received a grant of £14,500 from the Home Development Fund for the building and equipment of an extension of the School of Agriculture, chiefly for the accommodation of research institutes in plant-breeding and animal-nutrition. Oxford University will receive £900 a year from the fund, in aid of investigations into the economics of agriculture.

## DRAINAGE BY EXPLOSIVES.

### EXPERIMENTS ON THE PAKIHI SOILS OF WESTLAND.

A. MACPHERSON.

THE question of bringing into profitable use the vast areas of unproductive pakihi soils throughout Westland has been engaging the attention of the Department of Agriculture for some time. These soils are thus described by Mr. B. C. Aston, Agricultural Chemist, in the *Journal* for the 15th June, 1910 (Vol. i, No. 1, p. 22):—

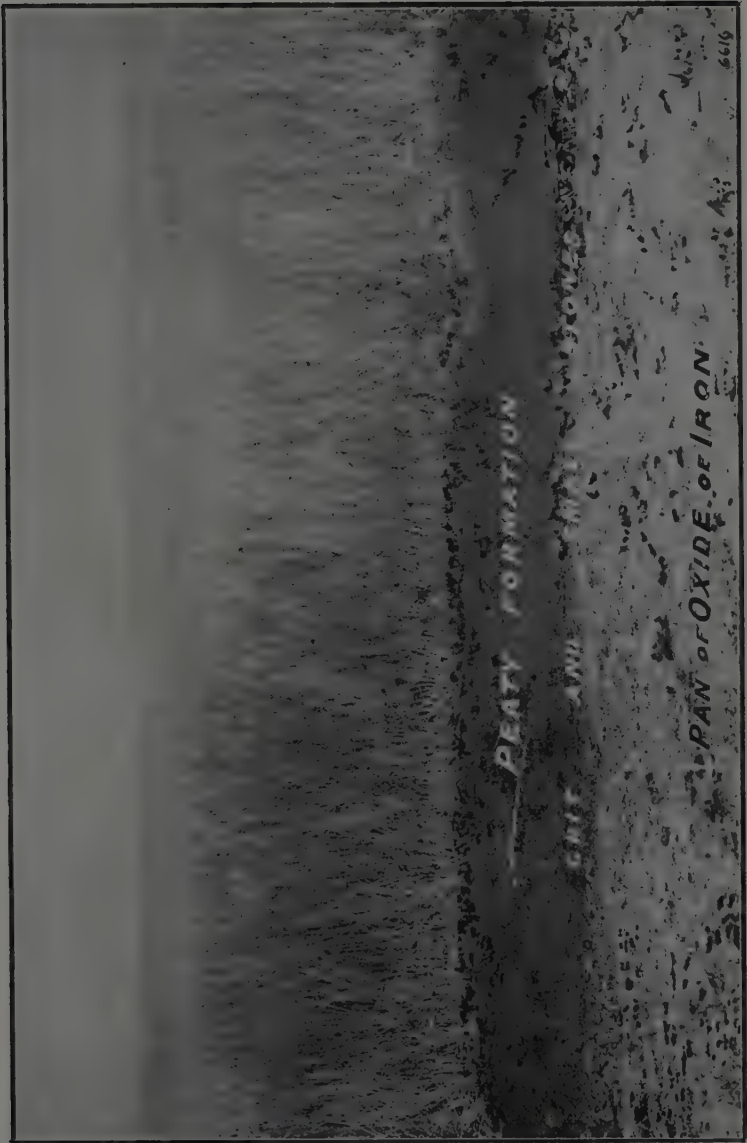
“ ‘Pakihi’ is a Maori word signifying an opening or clearing free from forest. There are in Westland large areas of sour, swampy, terrace land which support a flora such as rushes, fern, moss, and plants one usually associates with sour, water-sodden soils. On some parts a stunted growth of manuka (*Leptospermum*, family *Myrtaceae*) results. This type of country is usually known locally as pakihi land, or ‘the pakihis.’

“ The land generally is slightly undulating, and lends itself easily to improvement by drainage. The top soil is retentive and tightly packed; it overlies sand and a boulder or cement bottom. Iron pan is frequently present.

“ The major portion of the pakihi country is still Crown land. The practical farmer has always considered it a barren waste, and no serious attempts have been made to reclaim it. One or two attempts to burn off the rushes and sow down grass-seed have proved unavailing. On the drier portions of the pakihi the native grasses *Danthonia semiannularis* and *D. Raoulii* (snow-grass), or a closely allied species, occur. Clovers and leguminous pasture-plants will not thrive. The rainfall is probably about 115 in. per annum.”

In March, 1906, the first pakihi soil was analysed by Mr. Aston. In 1909 further samples of the soil were obtained and analysed by him, and went to show “they are all extremely deficient in available phosphoric acid and potash, while the total lime and magnesia is also deficient. The total nitrogen is, however, present in quantities comparable with those in fertile soils. Hence the proper treatment of these soils resolved itself into the augmentation of the supply of the organic or mineral plant-foods.” A series of plot experiments with the soils were also conducted by Mr. Aston, in Wellington. The result of these experiments went to prove that drainage followed by liming is a primary essential to success in dealing with such soils.





THE ABOVE PICTURE SHOWS SOME OF THE TOP SOIL REMOVED, LEAVING, ON THE LEVEL, THE OXIDE-OF-IRON PAN.

On the 22nd March last the experimental area was pegged off, holes were dug at intervals to ascertain the depth of soil to the pan, and if water was likely to accumulate in the holes. This was considered necessary before dividing the area into sections, each having a different drainage scheme.

Investigations were also made by the North Island Fields Instructor, Mr. G. de S. Baylis, and experiments on a small and easily surface-drained area were carried out with grasses and clovers on the farm of Mr. R. Falla, the land having been ploughed, cultivated, dressed with ground burnt lime, and manured with a mixture of 10 cwt. basic slag, 2 cwt. sulphate of potash, and  $1\frac{1}{2}$  cwt. superphosphate. The results were very promising.

Drainage being the primary essential to bring these lands into profitable use, it was decided to endeavour to do this by means of explosives. The proposal was brought under the notice of Mr. J. R. Leggo, representative in the Dominion of Nobel's Explosives Company (Limited), Glasgow, and, as the experiment to be undertaken was of vital importance not only to the Westland Province, but also to the whole Dominion, he offered, on behalf of his company, to provide the necessary explosives free of cost.

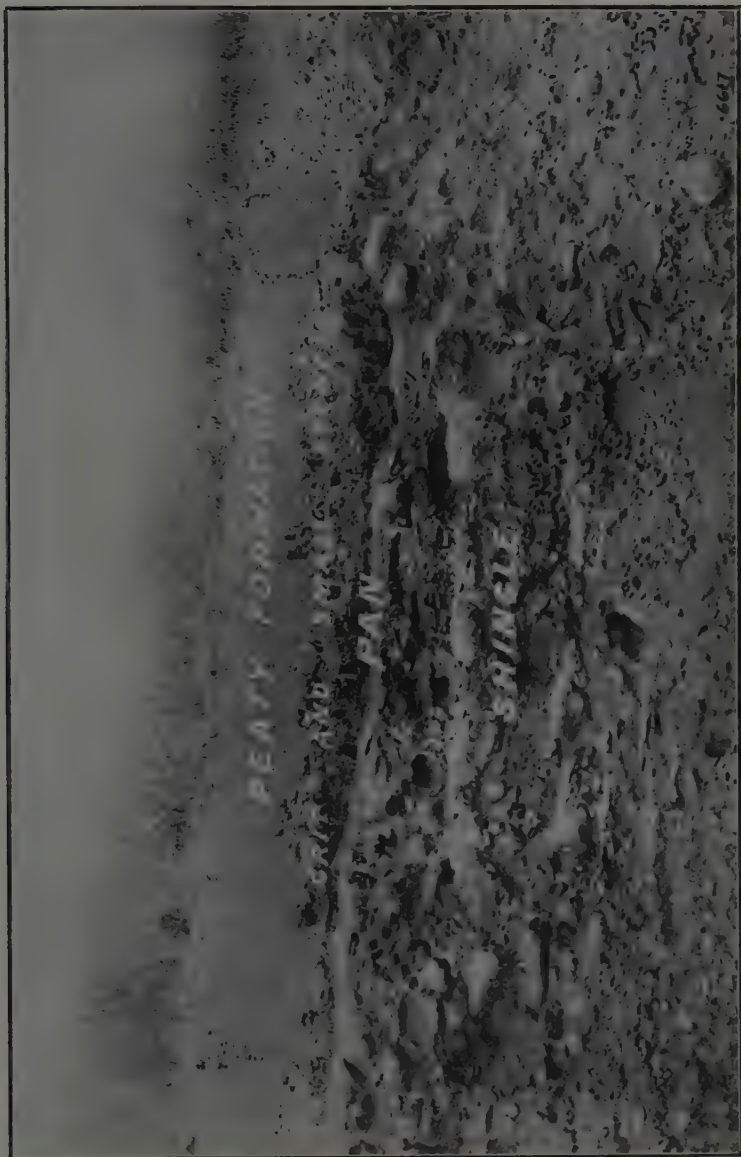
The objects aimed at in regard to the experiments were as follows:—

(1.) To secure as nearly as possible a perfectly drained area of typical pakihi soil on which cultural and manurial tests could be carried out, to demonstrate as speedily as possible the possibilities of bringing these vast unproductive areas into profitable use.

(2.) There being no data available regarding the use of explosives to drain similar lands, it was necessary to experiment in the direction of finding out the most expedient and economical means of drainage by such a method.

One acre, part of Recreation Reserve, Buller Domain (200 acres), Kawatiri Survey District, situated about four miles east from Westport, close to the main road, and adjoining the Westport-Mokihinui line, typical of about 10,000 acres of similar pakihi land in the vicinity of Westport, and considered of very little value, was selected on which to conduct experiments.

The area chosen has a northerly aspect, and a frontage of 5 chains along the railway-line, with a depth of 2 chains back. The land is 65 ft. above sea-level, and one mile from the sea-coast. The ground undulates slightly, having a fall from the centre towards the north-east of about  $2\frac{1}{4}$  ft., and the same towards the south-west. There is also a fall in the ground of about 1 ft. towards the railway-line on the northern side. The flora for the most part consisted of rushes, fern, moss, and stunted manuka.



AN EXCAVATED FACE SHOWING THE NATURE OF THE SUBSOIL.

The soil varies in depth and character, that on the western half being shallower and coarser than the soil on the eastern half of the experimental area.

Three samples of the soil were taken and forwarded to the Agricultural Chemist. The results of the analysis are as follows:—

#### ANALYSIS OF PAKIHI SOILS.

	C299-1. No. 1 Sample: Light-brown Silt.	C299-2. No. 2 Sample: Grey Silt.	C299-3. No. 3 Sample: Dark-brown Fine Sandy Loam.
Capillarity ..	.. Good	Good	Good.
Capacity for water ..	.. Fair	Very good	Excellent.
Reaction to litmus ..	.. Acid	Acid	Strongly acid.
Residue on washing ..	.. Very large (26 per cent.)	Fairly large	Small.

#### Mechanical Analysis.

Gravel ..	.. 2 per cent.	..	..
Fine gravel ..	.. 4 per cent.	Trace	Trace.
Sand ..	.. 26.0	10.0	5.0
Fine sand ..	.. 41.3	57.1	47.9
Silt ..	.. 15.2	12.2	11.8
Fine silt. ..	.. 9.8	9.4	9.3
Clay ..	.. 5.5	7.9	16.9
Moisture, &c. ..	.. 2.2	3.4	9.1
	100.0	100.0	100.0

#### Chemical Analysis.

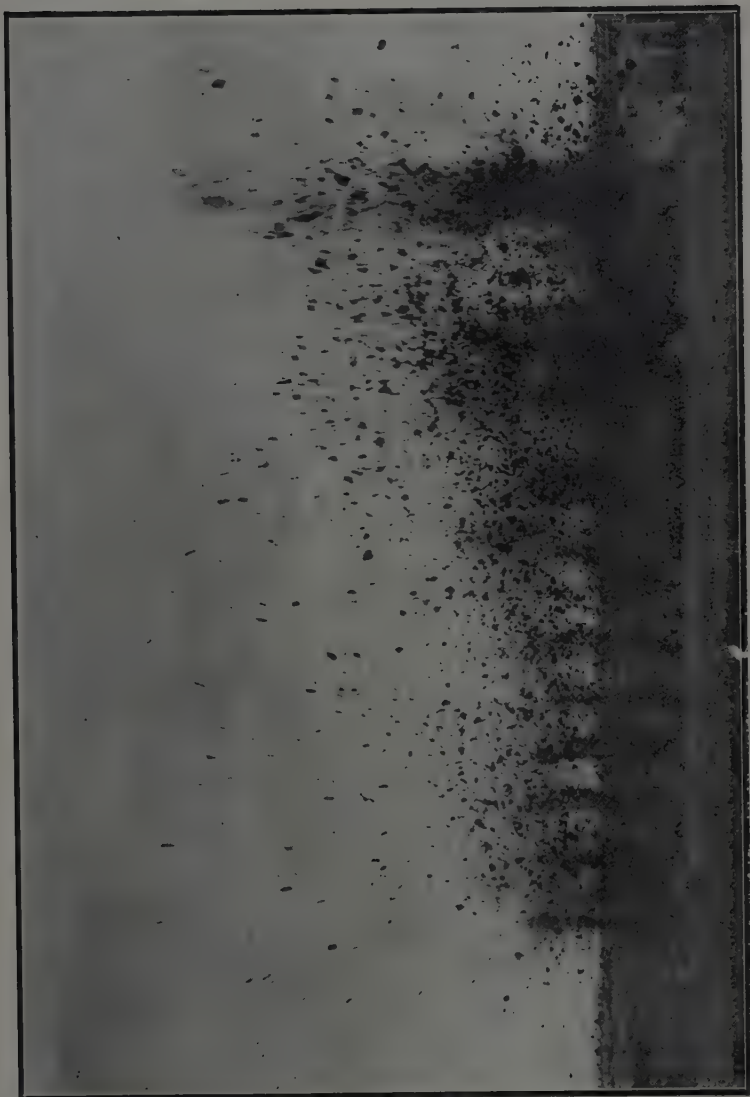
Moisture ..	.. 1.28	5.66	5.48
Organic matter and combined water ..	.. 4.72	11.17	25.73
Total nitrogen ..	.. 0.16	0.29	0.49
Available potash ( $K_2O$ ) ..	.. 0.011	0.010	0.015
Available phosphoric acid ( $P_2O_5$ ) ..	.. 0.004	0.004	0.004

#### Hydrochloric-acid Extract.

Lime ( $CaO$ ) ..	.. 0.08	0.08	0.07
Magnesia ( $MgO$ ) ..	.. 0.04	0.05	0.06
Potash ( $K_2O$ ) ..	.. 0.03	0.04	0.07
Phosphoric acid ( $P_2O_5$ ) ..	.. 0.02	0.03	0.03

Mr. Leggo, representative of Nobel's Explosives Company, supervised the manipulation and exploding of the charges, and also gave valuable assistance and advice. Before proceeding with the actual experiment he tested on a separate piece of land different grades of explosives, to ascertain which was most suitable for the work about to be undertaken. After trying monobel, blasting-gelatine, gelignite, and dynamite, he concluded the last-named was the most effective,





THE EXPLOSION WORK IN PROGRESS.

and dynamite, varying in size of charges according to the distance the holes were apart and their depth, was used throughout the test.

No. 1 plot was dealt with first, the holes being 4 ft. apart. The holes for the explosives were made with steel crowbars 5 ft. long, diamond-pointed, and driven into and through the hard bottom by means of sledge-hammers. The depth of soil to the hard bottom on this section varied from 11 in. to 21 in. The bottom consisted of hard-packed sand and boulders on cement formation, having immediately underneath an iron-pan stratum, the whole varying in thickness from 9 in. to 22 in. Thirty-two holes were charged with dynamite, two plugs to each hole, and were fired simultaneously by electricity. Some of the holes were then dug out, when it was found that only in a few instances had the explosives enlarged the holes made by the drill through the pan, and no fracturing of the pan from the drill-hole outwards had taken place. Water was poured into a number of the holes to see if percolation would take place. A further number of holes were charged and fired with the same results. In all, 160 holes 4 ft. apart were exploded in the same way. Scarcely any percolation was observable in the holes in which water had been put.

Parallel with the plot, but a chain and two chains northward on the railway and road reserves respectively, were shingle-pits cut into the pakihi. These showed the formation on which we were operating and the difficulties presented. As already stated, there was a fall in the ground from the centre of the experimental area, both to the east and to the west. On the western side, from the outer boundary of plot 1, the ground fell more sharply to a small watercourse. The side of the shingle-pit cut into the pakihi showed a section of the formation. The soil varied in depth from 11 in. to 21 in. Immediately under the soil and on top of the hard bottom there was a small layer of ironstone grit. The bottom, as already described, consisted of hard-packed sand, boulders, and cement formation, having immediately underneath an iron-pan stratum varying in thickness from 9 in. to 22 in. Under this again there were some inches of boulders and sand hard-packed, then a very thin vein or stratum of iron pan, then still another layer of a few inches of boulders and sand and a very thin vein or stratum of iron pan. Under this there was a porous substratum of free sand, shingle, and boulders for a depth of several feet. As the ground fell towards the watercourse, the top pan and the thin veins of iron pan lower down thickened and became united, forming a very thick and impermeable barrier to drainage unless all were pierced and broken up with explosives.

It was evident that, to effect drainage into the substratum of free sand and gravel, the explosive would not only require to be sufficiently powerful to break up the first pan, but the charge would also have

to be placed deep enough below it to break the small veins of iron pan underneath.

It was discovered that the free iron grit resting immediately above the main pan had a tendency to fill in the boreholes immediately the boring-tool was withdrawn. To obviate this it was decided to dig holes down to the pan, remove the grit, and then bore through the pan into the strata below.

Profiting from these discoveries, several trial tests were made in plot 1, where the previous charges had failed to give drainage. The results proved satisfactory and, with the same amount of explosives, better execution resulted.

Three days were occupied in experimenting, plots 1, 2, and 3 being dealt with. Heavy rain then put an end to further work for some time, but the scheme was eventually carried out on the lines indicated, no further difficulties being presented.

On the eastern side in plot 6, where the soil is deeper, there was an accumulation of water in the bores, owing to the amount of rain which had fallen, and this had to be pumped out before laying the charges.

In plot 1 the charge was two plugs of dynamite per hole; in plot 2 the charge was three plugs of dynamite per hole; in plot 3 the charge was three plugs of dynamite per hole; in plot 4 the charge was four plugs of dynamite per hole; in plot 5 the charge was five plugs of dynamite per hole; in plot 6 the charge was five plugs of dynamite per hole. With the exception of plot 1, where the charges were electrically fired, all the other charges were fired with blue sump fuse.

The depth of soil at each hole and depth of bore through the pan into the substratum was taken, and a record kept for future reference.

As already stated, the pan was not fractured by the explosives, it being apparently too tough. Holes about a foot or more in diameter was about the extent of the execution.

It will be well on in the spring before the results of the drainage can be ascertained with any degree of certainty, but as far as the indications go at present, the drainage has been fairly successful. The land has been ploughed and surface drains dug around the area.

Although not showing on the surface before the experiment was begun, there was a large quantity of yellow-pine timber in the area, quite four dray-loads being ploughed and dug up. This pine timber has a local reputation of poisoning the soil on which it grows.

Inspection made of other pakihi lands around Westport shows that they do not present the same difficult proposition as that met with on the Buller Domain, and that very large areas can easily be drained and dealt with at very little cost. The drain plough would effect great changes on some of the country.

## WHITE-CLOVER SEED.

A. H. COCKAYNE.

THE past season has been remarkable for the extremely high price of white clover, and the great superiority of local seed over that imported both in respect to purity and germination. Unfortunately, New Zealand does not produce sufficient seed for the local requirements, and large quantities are annually imported. A good deal of the seed harvested here is a by-product of the cleaning of rye-grass, and in those cases where it is secured from old-established pasture closely resembles that at present being sold in Britain as "wild white clover," and exploited at a price far in excess of ordinary white clover. The area actually devoted to white-clover seed is confined to the South Island, and rarely exceeds a few hundred acres.

In consequence of the smallness and poor quality of the European crop, it has been difficult for merchants to secure reliable foreign seed, and in certain cases the bulk fell far short of the standard on which it was purchased. Had the past season been favourable for bush burns there would have been a shortage of good-quality white clover, and the price for such seed would have reached a phenomenal figure. As it is, there must be a considerable amount of distinctly inferior seed being held over for next season.

### GERMINATION.

During the past season forty-four samples were tested for germination, and gave an average of 72·5 per cent. Excluding the local seed, which gave an average germination of 93·5 per cent., the foreign seed averaged 65·5 per cent., with a minimum of 30 per cent. and a maximum of 96 per cent.

Eleven New Zealand samples germinated as follows: Five between 95 and 100 per cent.; four between 90 and 95 per cent.; two between 88 and 90 per cent.

Thirty-three foreign samples germinated as follows: Five between 90 and 100 per cent.; six between 80 and 90 per cent.; two between 70 and 80 per cent.; two between 60 and 70 per cent.; eight between 50 and 60 per cent.; four between 40 and 50 per cent.; six between 30 and 40 per cent.



The percentage of hard seeds averaged 9.5, with a maximum of 32 and a minimum of nil. Hard seeds are a peculiarity of many members of the clover family. They are seeds in which the seed-coats are quite impervious to moisture, and, being unable to absorb water, they cannot germinate. In calculating germination it is estimated that one-half of them are capable of growing. This is regularly made in all seed-testing stations, as probably the majority of hard seeds may germinate when exposed to field-conditions.

#### EXTRANEEOUS SEEDS.

Twenty-seven samples examined yielded seventy-nine different kinds of extraneous seeds, varying from forty-one in one sample to five in another. The percentage of extraneous seeds by numbers varied from under 1 per cent. to over 17 per cent. The names and relative frequency of the extraneous seeds were as follows:—

	occurred in	26 of the samples.
1. Sorrel ( <i>Rumex acetosella</i> )	"	25
2. Rib-grass ( <i>Plantago lanceolata</i> )	"	24
3. Alsike ( <i>Trifolium hybridum</i> )	"	24
4. Timothy ( <i>Phleum pratense</i> )	"	22
5. Yellow trefoil ( <i>Medicago lupulina</i> )	"	20
6. Chickweed ( <i>Stellaria media</i> )	"	19
7. Selfheal ( <i>Prunella vulgaris</i> )	"	18
8. Suckling clover ( <i>Trifolium minus</i> )	"	16
9. Upright chickweed ( <i>Stellaria graminea</i> )	"	16
10. Night-flowering catchfly ( <i>Silene noctiflora</i> )	"	14
11. Red clover ( <i>Trifolium pratense</i> )	"	13
12. Fathen ( <i>Chenopodium album</i> )	"	12
13. Mouse-eared chickweed ( <i>Cerastium viscosum</i> )	"	12
14. Field madder ( <i>Sherardia arvensis</i> )	"	12
15. Small-flowered cranesbill ( <i>Geranium pusillum</i> )	"	12
16. Kentucky bluegrass ( <i>Poa pratensis</i> )	"	11
17. Mouse-eared chickweed ( <i>Cerastium vulgatum</i> )	"	10
18. Spurrey ( <i>Spergula arvensis</i> )	"	10
19. Alyssum ( <i>Alyssum alyssoides</i> )	"	10
20. Field chamomile ( <i>Anthemis arvensis</i> )	"	10
21. Forget-me-not ( <i>Myosotis arvensis</i> )	"	10
22. Plantain ( <i>Plantago major</i> )	"	9
23. Dodder ( <i>Cuscuta trifolii</i> )	"	8
24. Yellow cress ( <i>Barbarea vulgaris</i> )	"	7
25. Wild poppy ( <i>Papaver dubium</i> )	"	6
26. Yorkshire fog ( <i>Holcus lanatus</i> )	"	4
27. Scarlet pimpernel ( <i>Anagallis arvensis</i> )	"	4
28. Ox-eye daisy ( <i>Chrysanthemum leucanthemum</i> )	"	4
29. Stinking chamomile ( <i>Anthemis cotula</i> )	"	4
30. Perennial rye-grass ( <i>Lolium perenne</i> )	"	4
31. Scentless mayweed ( <i>Matricaria inodora</i> )	"	4
32. Speedwell ( <i>Veronica spp.</i> )	"	4
33. Sand clover ( <i>Anthyllis vulneraria</i> )	"	4
34. Cranesbill ( <i>Geranium dissectum</i> )	"	4
35. Red top ( <i>Agrostis vulgaris</i> )	"	3

	occurred in 3 of the samples.
36. Cress ( <i>Lepidium</i> sp.)	3
37. Small cleavers ( <i>Galium mollugo</i> )	3
38. Dead nettle ( <i>Lamium amplexicaule</i> )	3
39. Lucerne ( <i>Medicago sativa</i> )	3
40. Hawkweed ( <i>Crepis tectorum</i> )	3
41. Canadian stinkweed ( <i>Thlaspi arvensis</i> )	3
42. Birdsfoot trefoil ( <i>Lotus corniculatus</i> )	3
43. Sandwort ( <i>Arenaria serpyllifolia</i> )	3
44. West European catchfly ( <i>Silene dichotoma</i> )	3
45. Rough-stalked meadow-grass ( <i>Poa trivialis</i> )	2
46. Basil thyme ( <i>Calamintha acinos</i> )	2
47. Catchfly ( <i>Silene gallica</i> )	2
48. Shepherd's purse ( <i>Capsella bursa pastoris</i> )	2
49. Cinquefoil ( <i>Potentilla monspeliensis</i> )	2
50. Sweet vernal ( <i>Anthoxanthum odoratum</i> )	2
51. Crested dogstail ( <i>Cynosurus cristatus</i> )	2
52. Italian rye-grass ( <i>Lolium italicum</i> )	2
53. Nipplewort ( <i>Lapsana communis</i> )	2
54. Hawkweed ( <i>Crepis capillaris</i> )	2
55. American plantain ( <i>Plantago Rugelii</i> )	2
56. Field-dodder ( <i>Cuscuta arvensis</i> )	2
57. Large birdsfoot trefoil ( <i>Lotus major</i> )	2
58. Wild carrot ( <i>Daucus carota</i> )	2
59. Witch-grass ( <i>Panicum capillare</i> )	2
60. Pigweed ( <i>Amaranthus</i> spp.)	2
61. Treacle mustard ( <i>Erysimum chieranthoides</i> )	1
62. Pigweed ( <i>Amaranthus retroflexus</i> )	1
63. Storksbill ( <i>Erodium cicutarium</i> )	1
64. Catsear ( <i>Hypochaeris radicata</i> )	1
65. Sowthistle ( <i>Sonchis oleraceus</i> )	1
66. Prickly sowthistle ( <i>Sonchus asper</i> )	1
67. Soft cranesbill ( <i>Geranium molle</i> )	1
68. Toad-rush ( <i>Juncus bufonius</i> )	1
69. Hairgrass ( <i>Festuca bromoides</i> )	1
70. Broad-leaved dock ( <i>Rumex obtusifolius</i> )	1
71. Buttercup ( <i>Ranunculus bulbosus</i> )	1
72. Turnip ( <i>Brassica</i> sp.)	1
73. Curled dock ( <i>Rumex crispus</i> )	1
74. Wireweed ( <i>Polygonum aviculare</i> )	1
75. Catmint ( <i>Nepeta cataria</i> )	1
76. Pigeon-grass ( <i>Setaria viridis</i> )	1
77. Wild pansy ( <i>Viola tricolor</i> )	1
78. Lamb's lettuce ( <i>Valerianella</i> sp.)	1
79. Wild mignonette ( <i>Reseda lutea</i> )	1

Amongst the extraneous seeds noted were the following that have not, as yet, become naturalized in the Dominion :—

24. <i>Barbarea vulgaris</i>	occurred also in alsike.
46. <i>Calamintha acinos</i>	" "
61. <i>Erysimum chieranthoides</i>	" "
15. <i>Geranium pusillum</i>	" trefoil.
38. <i>Lamium amplexicaule</i>	" "
59. <i>Panicum capillare</i>	" alsike.
55. <i>Plantago Rugelii</i>	" timothy and red clover.
49. <i>Potentilla monspeliensis</i>	" <i>Lotus major</i> , timothy, <i>Poa pratensis</i> , and florin.
44. <i>Silene dichotoma</i> .	

Two of the samples examined were of American origin, as was evidenced by the presence of *Platago Rugelii*, *Panicum capillare*, *Cuscuta arvensis*, *Potentilla monspeliensis*, and *Erysimum chieranthoides* in them. American white clover is rare on the New Zealand market, except in seasons when the European crop is very short.

#### EXAMPLES OF INFERIOR LINES.

The following two examples give some idea of the quality of some of the poor grades that have been on offer:—

Sample No. 354.—Purity: percentage of good seed, 64 per cent. by weight; percentage of impurities, including shrivelled seed, 36 per cent. by weight. Germination of pure seed, 30 per cent. Real value,  $\frac{64 \times 30}{100} = 19.2$  per cent. This means that 100 lb. of the bulk contained only 19.2 lb. of white clover that was capable of germination. The price charged was 1s. 2d. per pound, so that the real price paid for 1 lb. of pure seed was over 5s. 6d. There were twenty-three different kinds of weed-seeds present.

Sample No. 455.—The germination was 34 per cent. The number of different kinds of extraneous seeds was forty-one, present to the number of 95,000 per pound. They included 50,340 sorrel-seeds and 13,620 rib-grass seeds. Altogether, in each 100 white-clover seeds there were thirteen extraneous seeds. As in 100 clover-seeds only 34 germinated, thus to every thirty-four clover-seeds capable of growing thirteen extraneous seeds were present.

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Mr. H. A. Reid, F.R.C.V.S., D.V.H., the officer in charge of the bacteriological and pathological work carried out at the Wallaceville Laboratory, has left for Europe on six months' leave of absence. Mr. Reid will devote a considerable portion of his time abroad to visiting the best laboratories in Great Britain and on the Continent, and generally doing what he can to get into direct touch with the latest developments of modern science so far as it bears on his particular work.

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The production of a new artificial manure, "biphosphate," is announced from Norway as a result of experiments at the Notodden Nitrate Works. The new fertilizer is a by-product of the nitrate of lime produced at these works, and is obtained without affecting the quantity of nitrate produced. Apatite or other raw materials are dissolved in the nitric acid and are then submitted to further treatment. Samples are stated to contain 26 per cent. of phosphoric acid (of which 92 per cent. is in citrate soluble form) and 23.8 per cent. of nitrate of lime. It is also stated that the fertilizer will, in future, be placed on the market with considerably higher percentages of both phosphoric acid and nitrogen and at a low price.—*Board of Trade Journal*.

## PLANT-BREEDING.

### THE GERMAN MOVEMENT.

PLANT-BREEDING in Germany began to assume importance in 1890, as a result of the success which attended the efforts of the first experimenters in this direction, the progress in the teaching of improved methods of cultivation in German universities, and the action of the German Agricultural Society as regards the improvement of seed. The formation of the Seed-improvement Section of the Society in 1886 led to the organization of the efforts of individual breeders and to the spread of knowledge as to the improvements effected.

Among the means by which the work of the Seed-improvement Section is carried on are the following: Lectures to farmers and scientists; competitions for the improvement of seeds; organization of the tests of varieties, with the co-operation of agricultural institutions; inspection and recognition of the seeds of growers, as fulfilling certain requirements as to purity, &c.; the registration of improvements in plants carried out within the German Empire, with the object of promoting and protecting such improvements and of protecting buyers against fraud as to the origin of the seeds; the encouragement of the cultivation of clover and grass for seed; and participation in national and international exhibitions.

In addition to the Seed-improvement Section, the society in 1888 inaugurated a "Seed Office." This office acts as intermediary between producers and consumers of seeds. Its object on the one hand is to create markets for the produce of reliable growers, and on the other to supply the buyers with varieties of known good quality, and to see that all requirements as to purity and germinating-power are fulfilled.

Work of a similar nature to that of the German Agricultural Society is carried on by various other institutions, such as the Federation of Agriculturists, which has established a seed-office and inspects seed-farms; the agricultural co-operative societies, which undertake the sale of improved seeds; and the Society for Promoting the Improvement of Plants.

At the present time a large number of the States have their own associations for seed-improvement, and the work is also carried on at agricultural institutes all over the country. There are State institutes for the improvement of seeds in Württemberg, Bavaria, Baden, and Saxony.

## BITTER - PIT.

MR. D. McALPINE, the Victorian Vegetable Pathologist, who is conducting investigations into the cause or causes of bitter-pit for the Commonwealth Government, has presented his first progress report. This will not be available before the Committee has dealt with the matter. The *Australasian*, however, publishes a summary of Mr. McAlpine's statements in regard to the relation of cool-storage to this vexed trouble. "A glance over the papers," says the Melbourne weekly, "makes it clear that Mr. McAlpine has recognized that the time has passed when opinions as to the cause of the disorder are needed, and he has got right down to the facts which experiments have yielded. To single out an instance, no better one can be taken than the results that have been achieved by holding fruit in cool-storage. In the summary reference is made to the oversea export phase of the question. Experiments conducted indicate that so long as uniformly low temperatures are maintained and proper facilities are provided for the drawing-off of the carbonic-acid gas by exhaust fans, so as to allow of the perfect circulation of air through the cases, the percentage of bitter-pit development during transit will be reduced to almost nothing. This was demonstrated by shipments made during the past season, and further suggested by the behaviour of fruit held in storage on land. Moreover, since making his report, Mr. McAlpine has been assured by a refrigerating engineer engaged in the oversea fruit-carriage trade that temperatures can be maintained constant within half a degree during the voyage from Australia to England. While in Brisbane a few days ago Mr. McAlpine visited the cool-stores used by the Department of Agriculture, which are conducted on the dry-air system, and found the temperature to be at 34°. Apples held in these stores for the past four months showed no signs whatever of bitter-pit. Taking into consideration the various experiments conducted in cool-storage, the results suggest that so long as the fruit is held at temperatures low enough to retard respiration no fears need be entertained of the development of the bitter-pit, either on land or during oversea transit. When, however, the temperature is allowed to fall below a certain point respiration ceases altogether and damage results. Apparently, the most satisfactory temperatures to maintain are those between 31° and 34°. The suggestion is conveyed that the adoption of the dry-air system of refrigeration in oversea boats and the maintenance of a constant temperature of about 31° and 32° will altogether revolutionize the oversea trade in fruit, more particularly as regards the development of bitter-pit during transit."

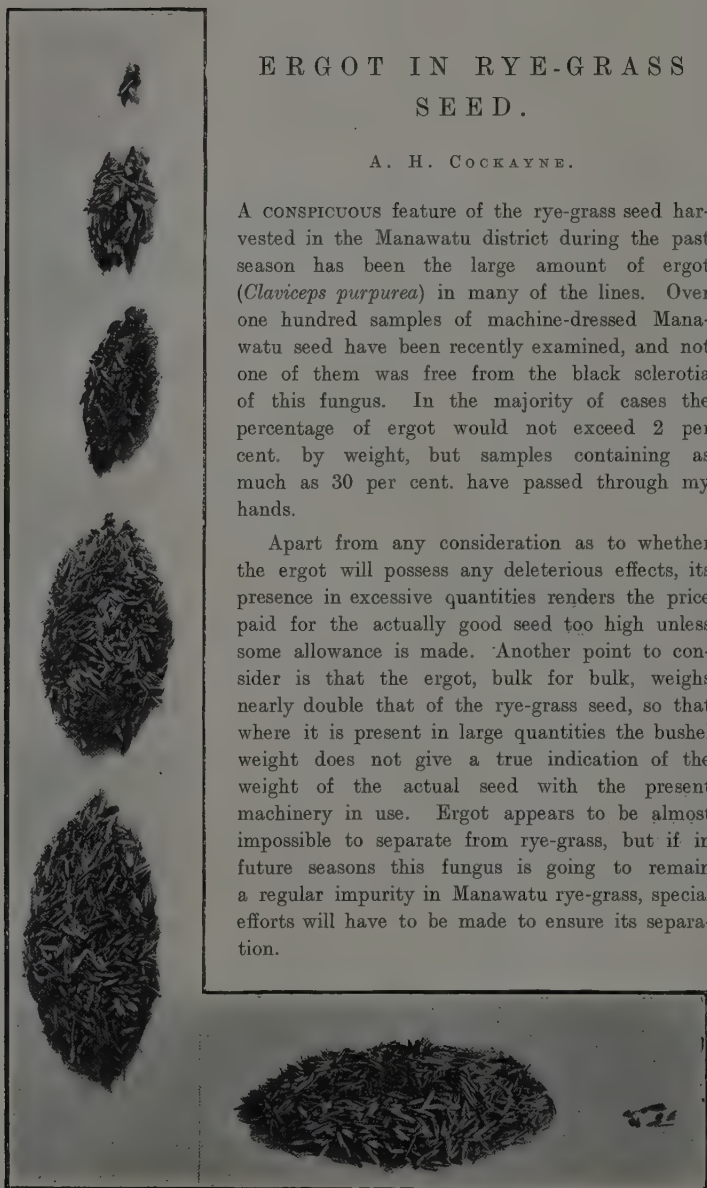


## ERGOT IN RYE-GRASS SEED.

A. H. COCKAYNE.

A CONSPICUOUS feature of the rye-grass seed harvested in the Manawatu district during the past season has been the large amount of ergot (*Claviceps purpurea*) in many of the lines. Over one hundred samples of machine-dressed Manawatu seed have been recently examined, and not one of them was free from the black sclerotia of this fungus. In the majority of cases the percentage of ergot would not exceed 2 per cent. by weight, but samples containing as much as 30 per cent. have passed through my hands.

Apart from any consideration as to whether the ergot will possess any deleterious effects, its presence in excessive quantities renders the price paid for the actually good seed too high unless some allowance is made. Another point to consider is that the ergot, bulk for bulk, weighs nearly double that of the rye-grass seed, so that where it is present in large quantities the bushel weight does not give a true indication of the weight of the actual seed with the present machinery in use. Ergot appears to be almost impossible to separate from rye-grass, but if in future seasons this fungus is going to remain a regular impurity in Manawatu rye-grass, special efforts will have to be made to ensure its separation.



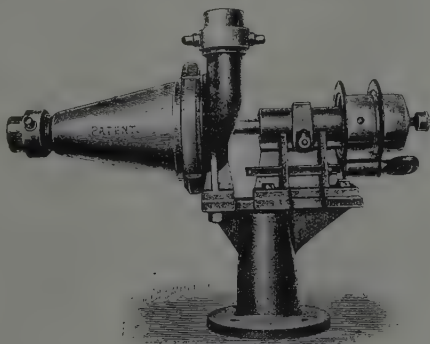
The illustration shows two samples of rye-grass of a definite weight with the impurities separated out.

The lowest heap in the side portion of the illustration on page 140 shows 10 grams of a certain sample. The heap above shows the pure rye-grass contained in 10 grams of the bulk; the third heap shows the ergot contained in 10 grams; the fourth heap shows the goose-grass contained in 10 grams; and the fifth shows the other impurities that were present in the ten-gram sample. A full analysis of this sample shows that the purity by weight is 67.3 per cent., and 1 lb. of seed was composed of 190,300 rye-grass seeds and 49,400 impurities, including 32,600 ergot spikes. One pound of the actually pure seed would have contained 284,000 rye-grass seeds.

The heaps at the foot of the illustration show 10 grams of a high-grade rye-grass with the impurities separated out. An analysis of this sample shows the purity to be 99.97 per cent., and 1 lb. of seed contains 250,300 rye-grass seeds and 495 impurities.

#### MACHINE FOR DESTROYING FROTH.

THE accompanying picture, illustrating a pump for destroying froth, has been forwarded by Mr. J. Pedersen, who is at present investigating in Europe the subject of casein for the Department, to his Director, Mr. D. Cuddie. Mr. Pedersen says the pump has been working in *Trifolium* for three months, and has given every satisfaction. The day he was in this great Denmark factory there was absolutely no froth, and as the milk on that occasion was rather sour the test was a severe one. It is not much dearer than an ordinary pump, and is very well built. The manufacturer of the pump is Mr. C. Poulsen, 17 Hejmdalsgade, Copenhagen.



Milk is perhaps the only article of food occurring in nature which contains in the correct proportions all the food-constituents essential for young animals.



A GOOD TYPE OF AN ENGLISH NON-PEDIGREE MILKING SHORTHORN.

## HERD - TESTING.

## THE MOVEMENT EXPANDING.

THE testing of the individual cow in order to accurately distinguish between the profitable and the unprofitable members of a herd, now being recognized as one of the essentials to the successful prosecution of dairy-farming, is making gratifying progress in this country. It was only three years ago that the first cow-testing association was formed—that of Dalefield—with a total of eight hundred cows owned by thirty-one members, whereas last season the number of cows under test was considerably over thirteen thousand, these including those in the associations privately controlled as well as those in the organizations working under the auspices of the Department.

The association at Dalefield was established in 1909, those at Cambridge, Kaupokonui, and Stratford a year later, and the associations at Whangarei and Stirling at the commencement of last season. All these have been under departmental control, and have more than justified their existence. Besides being of great benefit to the owners of the herds tested, by providing a reliable guide as to the best as well as to the worst cows—thus enabling farmers to set about improving their stock on sound and systematic principles—the associations have given the movement an impetus, the influence of which is extending to every dairying district in the Dominion.

The figures collected and published from time to time, and the facts deduced from each season's records, have clearly proved that the yield-testing of the dairy herd is a sound investment for the farmer. It is gratifying to see the expanding recognition of the great possibilities of herd-improvement; and inquiries are frequently being received by the Dairy-produce Division regarding the *modus operandi* of the system.

After continuing for two years to control an illustration association in any selected district, the Department relinquishes the running of the work in that particular locality, and proceeds to organize further associations in other districts, in order to disseminate the knowledge of the system as widely as possible. This arrangement allows farmers to assume the sole direction of the associations of which they are members, on the expiry of the time for which departmental assistance is given. It is very satisfactory to know that in some cases the testing is being continued by the dairymen at their own expense.

The most encouraging feature of the work is the formation of independent herd-testing associations by combinations of shareholders of some dairy companies in the North Island. It is needless, perhaps, to emphasize the fact that where neighbouring farmers co-operate in this manner they take a keener interest in the work, while its beneficent lessons are more likely to be generally applied in the practical grading-up of the herd of the district. Several such associations were conducted in the most creditable manner last year, while others are now being formed. Present indications point to the probability that the records of twenty thousand cows will be tabulated during the coming season.

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## MILK-RECORD AYRSHIRES.

### MARKET VALUE OF TESTED STOCK.

STRIKING demonstration of the money-making power of milk-records to the breeder of purebred dairy stock is the transformation taking place in the sale values of tested Ayrshire stock in the home of the breed. New Zealand breeders who have not yet been convinced of the goldmine in performance pedigrees by the sales at auction of the yearling Holstein bulls from the Weraroa herd of the Department may be stimulated to action by learning the result of a recent Ayrshire sale in Scotland. It was the Auchenbainzie dispersion sale. The 114 cattle made an average of £22 16s. 3d., the top figure being 100 guineas, given by Mr. T. Clement, the Scottish cheese-merchant, who recently presented a milk-record bull to the Dalefield Co-operative Dairy Company, and who is developing in Scotland a fine herd of deep-milking Ayrshires. The thirty-five cows in the above herd averaged £33 18s., the fifteen two-year-old heifers £25 9s., and the eighteen-months heifers £24 17s. At another late sale in Scotland, that of Lochfengus, an average of £21 2s. 2d. for 177 animals was obtained, the highest figure being 200 guineas. These are very different values to those which have ruled for the breed in the past. Performance and constitution are at last attaining their true market value, and fancy points are at a discount.

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About 30 per cent. of the cows in Friesland are tested regularly every fortnight. The estimated cost of a control association (milk-record society) comprising fifteen members is placed at £50, and as there are ninety-eight associations in the province the annual expenditure must be at least £5,000.



## COW - SHEDS .

## WORKING-PLANS FOR FARMERS.

IN order that the dairy herd may be handled with a minimum of trouble it is essential that the milking shed and yard be well arranged. If the building is well planned and the sanitary arrangements are satisfactory, the drudgery of milking is greatly reduced, while the risk of the milk becoming contaminated is thereby largely decreased.

Many dairy-farmers are recognizing the importance of planning their milking sheds and yards on proper principles, with the result that during the last few years many first-rate buildings have been erected. The number is being added to every season.

With a view to the further encouragement of farmers in this connection, plans of different types of cow-sheds have been supplied for some time by the Dairy-produce Division. Of late the demand for these has greatly increased. Almost daily applications are received from new settlers and others for copies of them.

On the following page there is a design of an open-fronted shed with a race leading to the bails. Two other plans will be published next month.

In drawing up these plans economy has been studied as well as efficiency. Nothing of an elaborate nature has been provided for. The cost of erecting the shed shown in the designs is not given, because of the varying prices of building-materials in the different districts, but the quantities of timber, roofing-iron, and concrete necessary will be found on the plans. If these particulars be submitted to any timber-merchant or builder, he should be able to give an estimate of the cost of the material required.

These sheds can be built in any size to suit the number of cows it is desired to milk at any one time, or to suit the particular site on which it is desired to build.

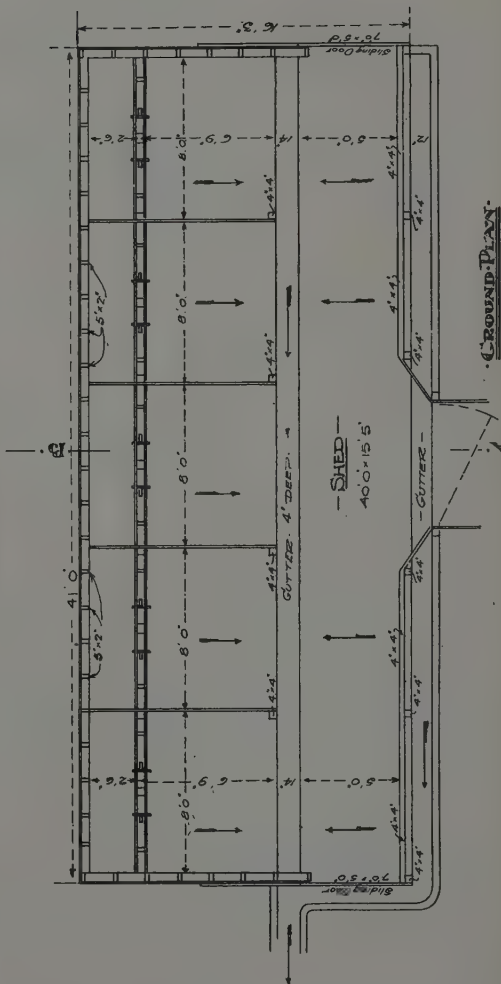
Copies of the designs can be obtained free of charge on application to the Director of the Dairy-produce Division, Wellington.

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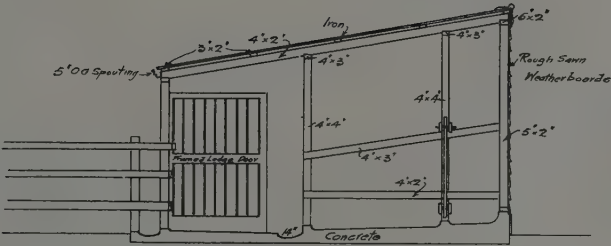
The American Jersey Club propose a by-law putting a fee of £20 on all cattle from the Island of Jersey, except the ones commended or highly commended.



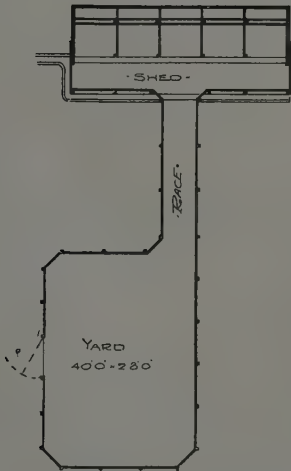
FRONT ELEVATION.



GROUND PLAN.



SECTION A-B



Approximate Estimate of Principal Items

Concrete	20 yds
Sawn Timber	
Scantling	1500 ft
Boarding	750 ft
Total	2250 ft
Galvanized Iron	
	42 sheets 9'0"

Block Plan Showing Position of Yard and Shed, etc.  
Scale 32 Feet to an Inch

## CASEIN.

## POSITION IN EUROPE.

IN a communication to Mr. D. Cuddie, Director of the Dairy-produce Division, Mr. J. Pedersen, a member of Mr. Cuddie's staff, who is at present in Europe investigating the casein industry for the Department, sends some interesting information arising from the inquiries he has already been able to make. Mr. Pedersen says he has been working in Denmark with the inventor of the lactic-acid method—that in general use—Mr. Wennewold, and the work has proved both interesting and instructive. When casein was first taken up in Denmark sour whey was used as the precipitating agent. The casein at that time was of a very inferior quality. After twelve months study with different acids Mr. Wennewold found that lactic-acid (starter) gave the best results when used with certain temperatures, and casein made by that process was found by all buyers in Germany to be the most satisfactory. "It was fortunate," writes Mr. Pedersen, "that I knew Mr. Wennewold in the old days, as without Mr. Wennewold's assistance it might have been rather difficult to get the thorough insight into the business I am desirous of obtaining. Mr. Wennewold thinks the prospect for casein is good. As he says, there are now a certain number of manufacturers who cannot use anything else in their processes. There are factories in Germany which have lately made contracts for five years, paying 68 marks per 100 kilos\* at the factory-door. This represents in Denmark about £33 per ton, or a good payable price. As casein can be kept for such a long time without much expense it is often held for speculating purposes, and there is now said to be a trust for keeping the price down. As you know, a lot of skimmed-milk cheese is made in Denmark. As the price of casein is low just now, quite a number of casein-factories are making skimmed-milk cheese. There is not likely to be an overproduction of casein, as skimmed-milk cheese will regulate this. Denmark is about the only country that could flood the market with casein. Skimmed milk has always a certain value here, and as the manufacturers must use casein the price cannot go below a certain point. Casein is largely used in the manufacture of paint. Up to the present a serious drawback in this connection has been that in solution casein would

\* 1 mark = 11½d.; 1 kilo = 2 lb. 3¼ oz.

only keep a short period, and a new solution had to be made nearly every day. Mr. Wennewold has just discovered, however, that by the use of certain chemicals it can be kept in solution for a good period. He showed me some which had been kept for over six months. It was of an even body throughout, and had no trace of smell. Its use, therefore, in the manufacture of paint, is likely to be very much extended.

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### NECESSITY FOR HERD-TESTING.

ACCORDING to Mr. R. Dingle, chairman of directors of the Stratford Dairy Co-operative Company, the average production of butter-fat per cow in the herds supplying the Stratford Company last season was 169.76 lb. If, said Mr. Dingle, suppliers could increase that production by 30 lb. a cow, it would mean an increase of £18,000 to the company on the year's operations. It may be noted that in the four herd-testing associations conducted by the Department last year the average cow gave a return of 224 lb. of butter-fat. Of course, in these cases the herds may be taken to have been rather above the average of the dairy herds in the respective districts.

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### TO SUBSCRIBERS.

IN forwarding renewal subscriptions for the *Journal* subscribers are particularly requested to return with their remittances the renewal-forms sent out from this office, so that there may be no mistake as to the origin of subscriptions received.

**P**REVENTION is always better than cure, and this is especially true in regard to septic metritis, which usually develops from seven to fifteen days after calving. If there is any reason to suspect the presence of this trouble on the farm the uterus of each cow should be irrigated with not less than two gallons of warm water with which a tablespoonful of Jeyes' fluid has been mixed. This should be done immediately the cow has cleansed, and before the neck of the womb has commenced to contract.



## THE HEMP INDUSTRY.

W. H. FERRIS.

DURING the past month milling operations were entirely suspended owing to the exceptional floods, even where millers were anxious to keep their plants going right through the winter. Millers independent of swamp flax were also compelled to cease operations, owing to the heavy rains making bleaching impossible. Notwithstanding this setback to the industry, the quantity coming to hand is, for the time of year, most satisfactory. The stripping and scutching is of a good standard, and the colour is exceptional—in fact, there is none of the discoloured hemp, common at one time owing to weak paddocking, coming forward for export in the winter. Millers have provided more drying-wires in order to facilitate the bleaching operation. Of course, the hemp being handled at the present time is from well equipped and properly managed mills.

With a return of fine weather great activity is expected in milling operations. It is satisfactory in this connection to know that milling plants are now generally of an up-to-date character, and, with the improved tone of the market, millers will have more confidence in extending operations than has been the case for many years. If present prices are maintained, many of the mills will be working with night and day shifts. Altogether a busy time appears probable.

The ruling values are better than they have been for three or four years. If they are maintained, they will be the means of encouraging a resuscitation of the industry in districts—particularly Auckland and Southland—where milling for some time has been unprofitable. It is to be hoped the improved prices will not induce millers to turn out inferior grades, but that the good standard of fibre they have been aiming at will be maintained and, where possible, advanced.

### MANILA HEMP.

According to the *Philippine Agricultural Review*, the abaca (hemp) growing districts were being affected in the first quarter of this year by the drought, which, it is reported, is responsible for the shortage of the Manila output. In the Albay district the abaca was reported to be drying up, but small crops were planted in parts where irrigation was available. In Ambos Camarines the growing plants were suffering from extreme heat and lack of moisture. In Leyte and Misamis the industry was reported to be reviving owing to the improved values. In the northern and north-eastern sections of Samar the planting of rice and the gathering of copra had been interfering with the hemp business.

## THE APIARY.

## NOTES FOR SEPTEMBER.

F. A. JACOBSEN.

At the time this goes to print the rich green leaves of early spring and the opening buds of flowers will form a transformation that all nature-lovers delight to see. The short cold days of winter will be lengthening gradually, announcing to us that the ripening days of summer are drawing near. The bees will commence to hum round their hives and go in search of water to help feed the young generation that is being nurtured within, and should there be a lack of stores they will sweep the surrounding country for nectar to assist in feeding their young. If this cannot be found breeding will go ahead only very slowly. If there be a dearth of stores the beekeeper should feed syrup daily in small quantities, thus leading the bees to think that nectar may be freely gathered, and inducing them to breed rapidly. The queen will lay eggs in circles in the brood nest at the rate of perhaps a thousand a day, and they in turn will be cared for by the young bees.

The eggs laid in worker cells are identical with those laid in queen cells, and are fed with the same kind of food for three days, when the hatching of the egg takes place. In the case of the queen this food, sometimes called bee-milk, is supplied in large quantities up till the last moment of its larval existence, no other food being given. But it is different in the case of the worker grub; for not only has its supply of bee-milk been restricted both in quality and quantity, but now—just before the time its ovaries are expected to develop—a change is made. Small quantities of honey and bee-milk only are fed till the end of its five days' larval life. As soon as the larva changes into the pupa state the characteristic organs of the adult worker bee begin to develop. She is equipped for outside work by having pollen-baskets provided on her legs, and her tongue is materially lengthened for the purpose of dipping into flowers for the nectar. She has cells provided under her body for the purpose of manufacturing wax. An authority states that it takes ten pounds of honey to produce one of wax. Above these distinctions she becomes exceedingly active and energetic, and develops an instinctive desire to revel in the fresh air.

The queen is purely an indoor creature, and after her nuptial flight remains in the hive performing her separate duty. She emerges to the atmosphere at swarming-time only, and heads the thousands of participants in the general discontent until a new location is found. Her whole life is taken up in the struggle to lay as many eggs as the nurse bees can look after and the season will permit, and so keep up the population of the colony. Any queen showing neglect in this respect should be replaced at some convenient time by one more prolific, as the number of bees matured in the spring largely determines the quantity of surplus honey that will be produced.

#### STIMULATIVE FEEDING.

It is generally understood that bees answer to spring feeding equally well if they have an abundance of stores or not: at least, in my own mind I am assured on this point. However, weak stocks are generally the only ones fed, and now is the time to look through the apiary and determine which is weak and which is strong. Do not disturb weak stocks too much, and when you start feeding it is advisable to continue to do so in small quantities until a little nectar is being gathered. The object is to deceive the bees into thinking a honey-flow is on, and under these conditions they breed rapidly, thus furnishing the hive with a large force of bees. Large, strong colonies are required for successful bee-culture. A suitable syrup is made with about two-thirds of water and one-third of sugar. Honey from an unknown source should never be used, as it may contain spores of foul-brood, and at all times cane-sugar is preferable. It is best to feed in the evening to guard against robbing. Fuller directions on this subject were given in the March issue of this *Journal*.

#### GENERAL.

This month is especially suitable for doing the cleaning-up work in an apiary, and for getting everything neat and tidy. First scrape the bottom boards of all the hives and keep the grass cut short, particularly round the entrances. Nothing looks better than a well-kept apiary; and labour spent in this work often repays the beekeeper many times over. Short grass is especially recommended round any hives where the queen has her wings clipped, for at swarming-time she may be easily detected hopping about in front of the entrance. It is not convenient to have long rank grass such as cocksfoot growing luxuriantly close to the sides of hives: it not only contributes to keeping colonies damp, but is a nuisance when super manipulations are in progress, the grass getting jammed between the supers and so spreading over the frames. When several apiaries are kept it is a

good plan to feed a few sheep or lambs in each. They are harmless and gentle, and eat the grass close down at night.

### LOCATING AN APIARY.

As the supply of grass and clover regulates the amount of stock to the acre, so does the same condition apply to what may be termed the grazing of bees. Unrestrained and at liberty, they fly where their desire prompts them, even to a distance of three or four miles from their homes: but this does not need to occur if a suitable site has been chosen. Rich land where clover grows abundantly and little cultivation is seen is more suitable for bee-culture than any other kind; and land of this description may be found in any dairying or bullock-fattening district. Sheep-grazing land is usually eaten too bare, yet occasionally I have heard of good flows of nectar from valleys in these areas. Plenty of willows scattered over good country add materially to the value of a district in supplying early spring feed; while a patch of bush close by would be advantageous to help in this respect. Catsear is also valuable as a nectar-producing plant, the honey being of an amber colour, smooth-grained, and of good flavour. After clover has done blooming, thistles, if in any quantity, may be expected to furnish an excellent honey of a white colour, and this blended with clover and catsear forms a very fine product and would always command the highest price.

I would warn any beginners against putting bees too near large phormium-areas, as the honey from this source is dark in colour and almost impossible to extract without breaking combs.

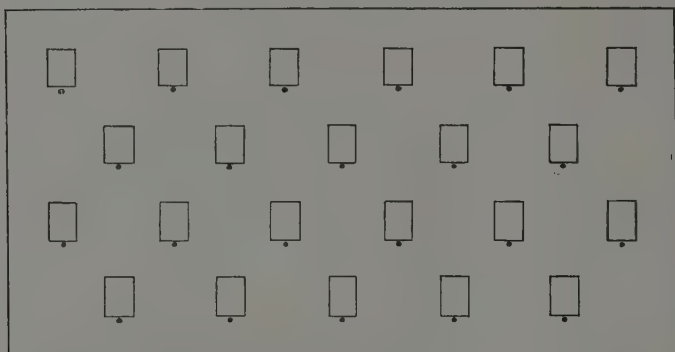
### SHELTER.

Next to selecting a good locality, arranging for good shelter is the most important matter. The formation of the ground about would perhaps assist in this respect. If any choice is given, select a low spot well drained, which will enable the bees to fly down when loaded for home. Such a position will lend itself more readily to being sheltered. It is preferable to make use of some natural shelter, if handy, providing the trees are not too large to cause a draught; and where there is open country I would advise putting up a temporary fence of boards or brushwood on the sides of the prevailing winds until a substantial green fence has grown. Tagasaste (*Cytisus proliferus*), sometimes called "tree-lucerne," grows very rapidly, and would make a good shelter in two seasons. Plant about 2 ft. 6 in. apart, and keep the ground round the roots free from weeds. It stands a great amount of cutting, and flowers along the branches very early in spring, thus forming a very welcome addition to early honey-producing plants.

If grown from seed, soak first in hot water and transplant carefully with plenty of ground left around the roots. The hedge should be protected from cattle. Do not place bees too close under big trees or immediately under hedges, or in any place that is damp, for under these conditions they become irritable and the combs are liable to get mouldy. Bees require shelter, but at the same time sunlight.

#### ARRANGING HIVES.

Various hive arrangements may be seen in the illustrations. In the one that finds most favour the hives are placed about 8 ft. apart each



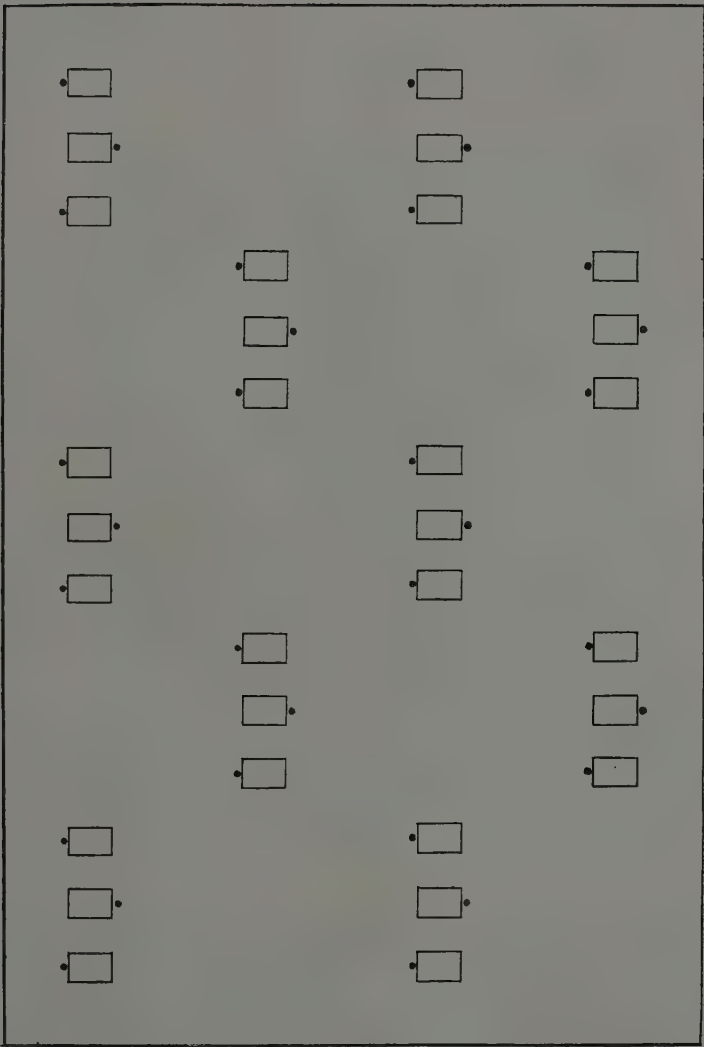
DOTS DENOTE ENTRANCES TO HIVES, WHICH ARE ALL ON ONE SIDE.

way, so that any three hives form a triangle. Under this system, no matter which way you look, they are in rows. Another convenient way is to place the hives in groups of two or three, each group distant from the other 10 ft. to 14 ft. If placed in groups of three the centre hive should face in the opposite direction to the two outside ones, so that no confusion can take place. Sometimes the hives are placed not more than 3 ft. apart in straight rows, each row placed from 6 ft. to 10 ft. behind the other. No one method seems to work more satisfactorily than another; so it is simply a matter of taste as to which system is preferred.

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The Commission appointed to inquire into the conditions of trade and industries in South Africa has reported that the industry of beekeeping should receive every encouragement. The importation of honey, foundation comb, &c., into the Union is prohibited.





DOTS DENOTE ENTRANCES TO HIVES : MIDDLE ONES REVERSED.

## ROOT-KNOT, CROWN-GALL, HAIRY ROOT.

### A PLANT-CANCER.

T. W. KIRK, F. L. S.

IN the Annual Report of this Division for 1906 reference was made to the root-knot which is found infesting many kinds of fruit-trees, and illustrations were given showing roots of peach, raspberry, &c., so attacked. At that time the trouble was believed to be caused by a slime fungus, scientifically known as *Dendrophagus globosus*. Since then very elaborate investigations have been conducted by officers of the United States Department of Agriculture, notably E. F. Smith, N. A. Brown, and C. O. Townsend. Their labours have proved the disease to be due to a bacterium called *Bacterium tumefaciens*.

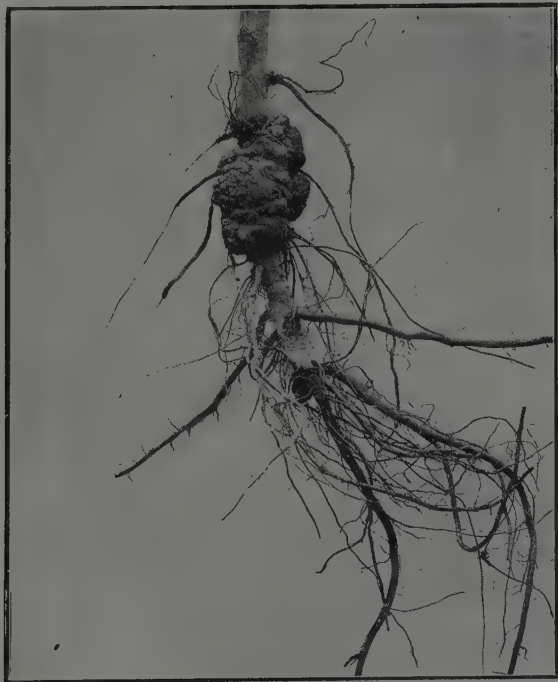
There is no intention to go fully into the subject here, but merely to draw attention to the fact that very considerable quantities of young trees, more particularly apples, have recently been distributed throughout New Zealand, the trees having been, at any rate for the most part, imported from Australia. The three photo-engravings given herewith are published in order to make fruitgrowers familiar with the general appearance of affected trees.

It is maintained by some that apple-trees do not seriously suffer from the presence of these tumours. Now, while affected trees may be found which are apparently flourishing, it is by no means certain that they will continue to do so. On the other hand, we have numerous instances of affected trees planted last season which have not made any new roots at all, and in many cases the roots have rotted back.

The subject has not yet been studied for a sufficient period in this hemisphere to warrant anyone saying the disease is not serious. On the contrary, present experience shows that at least under some conditions it is almost disastrous. Experience on this side of the world being limited, we must fall back on American investigations. The following brief summary may be made from the latest and most exhaustive publication issued by the United States Government—viz., "Crown-gall of Plants, its Cause and Remedy," by the authorities mentioned above.

1. "Crown-gall is a disease common in nurseries on the roots and shoots of various plants, and likely to continue when they are removed to orchards, &c. This name is used for the disease whatever the situation of the galls on the plant."

2. "The investigation proved the tumours to be due to *Bacterium tumefaciens*, galls being produced by inoculating healthy plants with a culture made from infected specimens."



AFFECTED ROOT.

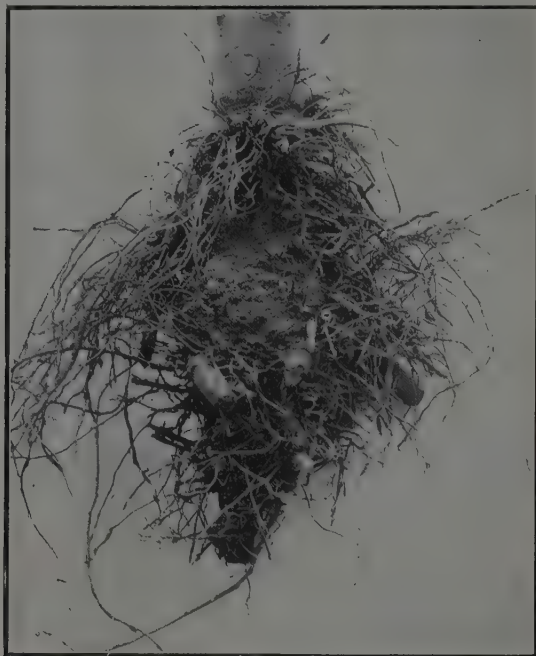
3. "The apple hairy root, hitherto a disease of unknown origin and supposed to be non-infectious, has been shown to be due to bacteria which culturally and morphologically differ, if at all, only slightly from crown-gall organisms."

4. "Typical hairy root has been produced on sound apple-seedlings by pure-culture inoculations."

5. "The abnormal growths which we have designated indifferently as tumours or galls are believed to be like malignant animal-tumours in various particulars."

6. "The disease is one which progresses slowly, stunting the plant first and finally destroying it, unless removed by extirpation or by the development of increased resistance on the part of the plant."

"Up to this time the best method of dealing with this disease remains the old one of strict inspection of nursery stock and the rejection of all plants found diseased. In individual cases this undoubtedly works hardship to the nurseryman; but, on the other hand, to allow him to sell galled trees injures the fruitgrower, serves to distribute the infection broadcast, and tends to destroy his own reputation. The nurseryman's remedy lies in careful methods and the abandonment of infected soils.



ANOTHER TYPE MORE SERIOUSLY ATTACKED.

"By no amount of special pleading can it be made to appear that an infectious disease should be tolerated on nursery trees offered for sale simply because it is rather prevalent and is inconvenient to deal with. *Before the nurseryman can be allowed to sell such trees*

*without restriction he must establish conclusively that it is not injurious and not transmissible to susceptible species.*

"We are inclined to include apple-trees also in this recommendation. While they seem to be less subject to crown-gall in a serious form



A THIRD SPECIMEN.

than some other plants. frequently they do not make good trees. Moreover, when apple-gall does not itself seriously injure the tree it may serve, as we have seen, for the entrance of other parasites."

Such is the present advice of the best authorities. While some affected trees have in New Zealand made good growth, others have done quite the reverse. That some nurserymen consider the disease injurious is shown by the fact that numbers of recently imported trees have had the galls removed with a sharp knife and the wound rubbed with mud, to disguise the operation.

*The wisest course, pending the production of positive proof one way or the other, is to reject all affected trees.*

The cause of the galls having been determined, steps have been taken to prevent the importation of infected trees.



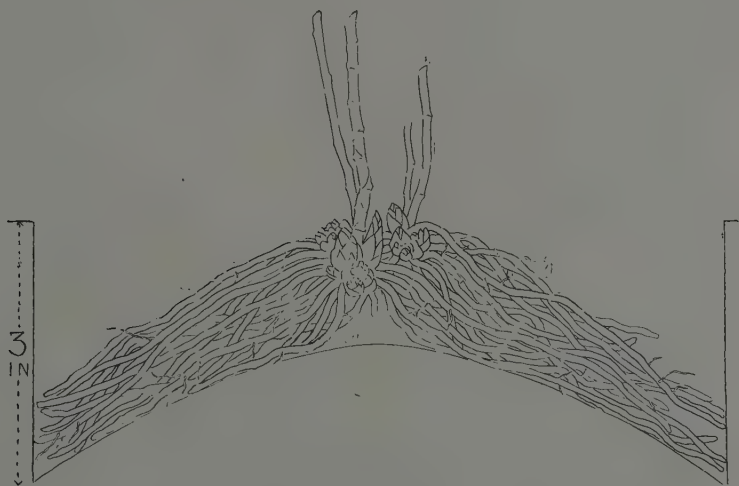
## THE FARM GARDEN.

W. H. TAYLOR.

### VEGETABLE GARDEN.

*Asparagus*.—As planting-time is approaching, preparations that are necessary should be completed at once. It may be as well to give some particulars of the different methods of cultivation. The old-fashioned way of growing asparagus was on raised beds, with plants crowded together and fed with manure to the greatest possible extent: this being rendered necessary by the crowded state. This old plan is largely superseded by planting on the flat, the plants being placed at greater distances apart; with this plan less feeding is necessary, and less elaborate preparation of the beds. Old customs die hard, and there are still many who follow the old plan. Personally, I think such to be very much behind the time, and frequently derive satisfaction from envious eyes cast on our bed planted in the modern style. To plant in the old way it is necessary to trench the ground at least 30 in. deep; and with each layer of soil, beginning at the bottom, to work in a large quantity of stable manure. The beds are made 4 ft. wide, with an alley 2 ft. wide between each; the whole of the ground is trenched, and the soil from the alley thrown up on to the bed in sufficient quantity to leave the bed about 1 ft. higher than the alley. The plants are arranged in three rows, one in the centre, and one on each side, at a distance of 15 in.; plants are usually put 10 in. apart in the rows. The modern plan, and the plan I advise and practise, is to prepare the ground in the ordinary way for vegetables. All soil for vegetable-growing should be trenched, unless it is naturally deep. Asparagus requires the same opportunity for deep rooting, and the same freedom from stagnant water as other vegetables must have if they are to be well grown—no more, no less. The soil need not at the outset be made inordinately rich—in fact, it is better to feed a little at a time, and at no time will large quantities be required. Judicious and fair return must be made, of course, or the growth will not remain good for many years. My own bed was put down in 1907, and has had no stable or farmyard manure since. The produce has been good so far, a thing which would have been impossible with the old-fashioned bed. I advocate putting in the plants 30 in. apart each way. The return is, I am satisfied, better than when planted closer: the

heads are larger, and each root produces a larger number than in the crowded bed. The time to plant is immediately after growth begins; it is dangerous to plant before that, for, as the roots are fleshy, they easily decay if they lie long in the ground in an inactive state after the unavoidable damage in lifting. This may cause loss of plants, and a feeble start. Care in planting is necessary; the roots must be spread out nearly flat in all directions. The best way is to take out a shallow trench with a shovel. This, according to the most successful growers, need not be so deep as formerly advised—3 in. is sufficient. With a rake raise a slight ridge in the centre of the trench; the crowns of the



HOW THE ASPARAGUS-ROOT SHOULD BE PLANTED.

plants rest on this with roots outspread. The soil is then returned; it should be left loose, not trodden down. The crowns will be just covered with soil, and that is as it should be. Established beds that received a coat of manure in the early part of the winter, as advised, should now be relieved of the rough remainder; then give a dressing of salt, 8 oz. per square yard, or half that quantity of nitrate of soda. If the beds are on the flat, the soil should be lightly pointed over with a fork; if the beds are raised, a little loose soil from the allays should be thrown up, and raked off again before the manure is applied.

*Turnip*-seed may now be put in. Early Milan is the quickest I have grown, though Snowball takes very little longer to mature. Sow only a very small breadth, according to requirements, of course. They only remain fit for use a short time during the summer months; a fresh sowing should be made about every seven weeks.

*Onions* should be up by now. If so, never allow the soil to remain set between the rows for long; keeping the surface loose is a great aid to getting a good start. Growers of large areas will in many cases still have sowing in prospect. Get it done as soon as possible; advanced growth is desirable before dry weather sets in, otherwise the bulbs are sure to be small. Pay a good price for good seed, and sow thinly; for thinning is an expensive operation if much has to be done, and labour is lost if thin sowing results in gaps from bad seed.

Early-sown *carrots* should be coming on. It is not advisable to thin these severely. The object is to obtain early roots. They are fit for use when less in size than the fingers of one's hand—in fact, while of that small size they are at their very best as regards mildness of flavour. The lines can be repeatedly thinned when drawing for use, until the last of the crop attains normal size; in this way a comparatively very small bed will suffice.

If *lettuces* have not yet been planted, sow the seed as soon as possible. *Cabbage* and *cauliflower* should be out before now. They both require rich ground; for, if starved, they are liable at this season to bolt to seed instead of hearting. This is particularly applicable to cauliflowers; the early types are very prone to button prematurely. To prevent this give each plant a tablespoonful of nitrate of soda during rain; if the soil is fairly rich in plant food this will start the plants off into growth, but it would not be of much use in very poor ground.

*Leek*-seed may be sown in drills for transplanting. Do not sow too thickly. Use a longer drill in preference, and do not sow in boxes: I have never yet seen good results from that practice, for unless they are taken from the boxes while very small they get a check, which develops a tendency to bolt to seed.

*Tomato*-seed may be sown in boxes sheltered by glass, in a warm situation; *celery*-seed likewise, if wanted early. But if the latter is required in winter only, the time when it is most valuable, defer the operation till mid September, and then sow in the open ground in well pulverized rich soil. The practice of sowing marrow and similar seeds in boxes about this time is one I do not approve of. I have long discontinued it, finding it better to put the seed in early in November where the plants are to grow.

*Peas* should be sown bi-monthly, to maintain the supply. It should be always borne in mind that peas are much improved when supported by sticks. Dead manuka provides the best sticks in this country, and where they are easily procured it pays well to use them; not only is the crop enhanced both in quality and quantity, and gathering

much facilitated, but the ground is more easily kept in good condition, so that there is an all-round benefit; and, further, the grower is enabled to cultivate taller-growing sorts, which are usually superior to dwarfs both in size of pea and quality. But failing the sticks it will be more profitable to grow the dwarf sorts, for reasons set out in a former article.

*Herbs.*—A domestic garden should be always well supplied with these, for reasons I need not dwell upon. Some of the fancy things can well be dispensed with, such as summer savoury and chervil; but sage, thyme, winter savoury, marjoram, mint, and parsley every one should have. All are easy to grow, and can be obtained from seed; or a sixpenny plant from a nursery would supply a nucleus for increase. Many fail to grow mint because they plant it too deeply; if a matted clump is to be planted it is sufficient to press it on to the surface, and perhaps throw a little loose soil over it. Parsley requires sowing every spring, or let it seed and transplant some of the young plants that are sure to come up. Thyme, sage, marjoram, and winter savoury all stool out; they run out in a few years if not disturbed, for which reason every second year the clumps should be dug up, pulled in pieces, and young offsets from the outside replanted.

#### ONION VARIETIES.

No. 1.—Brown Globe; weight of 6 bulbs,  $6\frac{1}{2}$  lb. A valuable long-keeper, frequently keeping till the next crop is ripe. For extra large bulbs sow at the end of March and transplant in the spring. To obtain the longest-keeping bulbs sow in spring, and do not transplant.

No. 2.—Ailsa Craig; weight of 5 bulbs, 14 lb. The chief value of this variety, which is in use from time of ripening in March till the end of July, is for boiling whole; it has a mild flavour. It is also valuable for pulling in an undeveloped state, as the bulbs are of considerable size long before reaching maturity. Sow at the end of March, and transplant in spring.

No. 3.—Brown Spanish; weight of 6 bulbs, 8 lb. The same remarks apply as for Brown Globe.



No. 1.

No. 2.

No. 3.

## SMALL FRUIT.

*Red Currants* should be always trained to one stem, which should rise 10 in. or 12 in. above the soil before branching, all suckers being rigidly suppressed. From the main stem three to four main branches are started, these in due course topped to about 12 in.; the number is doubled, and that will constitute the bush; all side shoots are to be cut back to spurs about three-fourths of an inch long, and it is these spurs that bear the fruit. With this mode of training and rational manuring and cultivation, a good crop of fruit is assured, provided—and the proviso is important—the right kinds are planted. There are in this country many bushes that always were and always will be barren; root them out. Good kinds are La Versailles, Cherry Red, Fay's Prolific, Chennanceau.

*Black Currants* require very different treatment. They succeed best in soil with a cool bottom. This is not necessarily clay, for that is frequently the very driest in summer; a deep soil is likely to be best supplied with moisture in summer. The fruit is borne on the young wood as well as on spurs on older wood; consequently pruning must be in accordance. Black currants are specially subject to attack from the borer, and this has to be combatted. The great desideratum is to keep up a supply of healthy young wood, and this is best maintained by stooling. "Stooling" means, throwing up shoots from below the surface of the soil; to induce them to do this the cuttings are put in as taken from the bush, with all the buds on. In the first instance sufficient branches are led up to form the skeleton of the bush; these are shortened to make them branch. In future weak shoots are to be cut back to spurs, and strong ones left to bear fruit. After several years, as the older branches get worn, they are cut out, and young suckers left in their place. By this means the whole bush is frequently renewed, and the borer is beaten.

*Gooseberry* bushes are pruned in various ways. Whatever plan is adopted, the aim should be always to lift the branches upward, and to some extent outward. Varieties with a pendant habit should have lower branches cut out, and those left pruned to an upward bud. Branches should be thinly disposed, crowding should be avoided. Fruit is borne on spurs on the old wood as well as on wood of the previous season's growth, but light is necessary to keep the old spurs fruitful. I am opposed to the spur-pruning system as practised in the Home-country; it does not answer well here, being usually responsible for a crowd of young shoots, and frequently—as I have witnessed—for the death of the bushes from over-restriction of growth causing stagnation of roots and collapse. I prefer to retain a good supply of young shoots. The system is: spur-prune in the heart of the bush, let young shoots remain on all high and outward parts, these to be



merely tipped to remove immature ends. Occasionally renew parts of the bush by retaining strong growths in suitable positions, removing old branches to make room for them.

*Strawberries.*—It is not too late to plant these—in fact, I give preference to this time of planting over all others. It is true I prepare my plants for it by carefully nursing them in a small auxiliary bed of good soil; but in any case I maintain it is best not to put them out until immediate growth is assured, and soil is in a sweet state. One great advantage in spring planting is that it affords opportunities to work the soil till the last possible moment; thus plants are put out in soil that is free of weeds and insect pests, and that has not become sour during the winter.

*Loganberries.*—These may still be planted. In treating old bushes remember that the long new rods may be the most profitable part of them, and remove old ones to make room to lay in new. There is not at all times an abundance of young rods; that depends on treatment previously given. Young rods may be laid in if on a wall or fence as close as 6 in. or 8 in. of each other. Last year's rods bear fruit the coming season; they are good for two years, but are usually barren the third year, so should be replaced after bearing twice.

#### FLOWER-CULTURE.

*Roses.*—Pruning having been done at the proper time, these are now coming to active growth. Manuring is usually done during winter; if not, and it is wanted, it would be best now to throw it over the surface and let rain wash it in, rather than risk injuring young roots by digging. Frequently the young shoots are attacked by aphid, and a little later the leaves by caterpillars; then there is often a rush to spraying. Let the spraying alone as long as possible. A better way is to take a soft plate-brush and dislodge the aphid with that, and crush the caterpillars with the fingers. Spraying too early often injures the foliage and does more harm than good. A plethora of aphid is frequently the result of overmanuring.

*Dahlias.*—It is now time to be looking after these; a large number are lost each season by bad treatment consequent on not understanding them. There are two classes of people who have success with them,—viz., those who understand them, and those who neglect them almost all the time. This may seem paradoxical, but it is absolutely true, for losses are mainly due to injudicious interference by those who lack experience. Dahlias purchased may be received in either of three forms: they may be divisions of the old tuber, small tubers entire, or rooted and growing cuttings. The former class of plant is seldom sent out now; the second is the best and most usual form; the latter is supplied in the case of scarce and new varieties, when stock

is small. These are not usually available till October, because they are cuttings from spring growths; they make perfectly good flowering-plants the same season if successfully established. It should be remembered that they have been rooted in a warm house or hot-bed, and consequently require careful hardening before planting out, and careful protection from slugs afterwards, for if they get nibbled they are sure to rot. The small tubers are produced from cuttings rooted in small pots last season; the diminutive size is the result of being cramped in the small pot. They are a *multum in parvo*, comprising all the parts and functions of a large clump of tubers. This is the best form of plant to buy; but even these require careful manipulation at the start. It sometimes happens, through no one's fault, that some of these tubers are blind—viz., have no eyes or buds; these never grow. Others may have but one eye, and if that is lost the tuber dies. It is therefore necessary to take great care of them. It is best to plant them first in boxes in light sandy soil; then if they are placed on a mild hot-bed they soon grow, even shy ones soon starting. Failing the hot-bed put them in a frame or greenhouse; failing both, in a warm sunny corner: surround the box with a strip of tin to keep slugs away. They may be planted out when well started. To return to the first form mentioned, and deal with the tubers in the garden: to treat them satisfactorily it is necessary to understand their mode of growth. The tubers, or potatoes, are of no value to the future plant, growth comes from the neck, the thickened part between the stems and the tubers; if this decays all is lost. A frequent cause of loss is their being nibbled by woodlice and slugs: both have a great liking for the tubers. Therefore they require to be protected from both. The best way is to leave the tubers where they are till spring; the necks, being buried, are protected. Then lift, divide as wanted, and replant at once. If they have been lifted they are best protected by placing them in a dry and sheltered place in the open—under partial protection of trees is a good place—and to cover them up over the necks with light soil. There are places where this precaution is not necessary, but there is usually some danger. Dividing is best left till the buds begin to grow, so that one growing bud at least can be assured to each division. Tubers that have been stored and not covered should be divided and heeled in a bed of light soil in a raised position to start them before planting out.

Complete the planting of herbaceous stuff, of which perennial phlox and Japanese iris are examples. Hardy annuals may be sown where absence of frost permits. It is useless to sow where frosts prevail until danger from them is past; for, even if frost did not destroy the seedlings, they would make such poor headway as probably to render them useless. Under glass raise seed of all the half-hardy annuals—Asters, salpiglossis, ten-week stock, zinnias, celosias, &c.

## THE POULTRY INDUSTRY.

F. C. BROWN.

SEPTEMBER.

ON the majority of plants September is the busiest month of the year. It is then the bulk of the chickens which are to produce the dear egg next season are to be incubated. He who has neglected to have everything in apple-pie order preparatory for this important period will now experience the weakness of his vacillating policy. The work of incubating and brooding a large payable flock of layers is a heavy one, but it will not prove wearisome if all the arrangements on the plant are working smoothly. In fact, it may very well, and should, be the most interesting period of the year. Many readers of these notes will probably be expecting to have some hints supplied at this time in regard to incubating. This is not such a simple matter as it may appear to be on the surface. There are now so many machines on the market, and there is such a variation in the methods of providing the necessary temperature, ventilation, and moisture, that it is impossible to lay down a general rule. Very often an incubator is said to have done bad work, whereas the failure was more with the operator than with the machine, while, on the other hand, a poor incubator may, in the hands of a good man, produce excellent results. There are so many things responsible for unsuccessful hatching that it is necessary to look for the cause in many quarters. For instance, if the desired germ is to be obtained the breeding-pens must possess the necessary constitution. I have seen breeding-pens with one outstanding cockerel—a bird conspicuous as being of the most virile type—and the eggs from this cockerel's pen could be easily picked out in the incubator by reason of the strong embryo and the violent contrast it presented to that in the eggs from pens where constitution was not such a dominant feature. No matter what make of incubator is used with such eggs, providing ordinary care is taken, a decent result will be secured. Certainly, with eggs showing a weak germ ideal conditions are demanded throughout the incubating process if good results are to be obtained. Even then, however, sound payable stock cannot be reared, however carefully the incubating process is carried out. In talking of the success or otherwise of the work of hatching, too many breeders attach main importance to the number of chickens hatched. I have often been told about 98 per cent. to 99 per cent. hatches, though I have never attained these splendid

averages myself. The high average, after all, is a minor consideration. It is not the chickens hatched, but the chickens reared, that determine success or failure. It may be said that this has nothing to do with incubating, but is more closely related to the work of brooding. Here again we see a common error. It is the strength of the chicken as it leaves the incubator which largely determines whether it will pay to rear. To boast of high hatching percentages is a bad fault, for it encourages one to keep chickens which will never pay for the cost of rearing. The wise man will not waste his time in putting weaklings into a brooder, for even if they come to maturity they will probably never pay for the cost of keeping and be a drag on the profits of the plant. There are rules which will apply to all kinds of incubators, the observance of which is essential to success. Among the most important are those prescribing the maintenance of an even temperature—about 102° for the first week, 103° for the second and third week, and 104° to 105° when hatching—and sufficient ventilation and moisture. Climatic conditions have a considerable influence, and these must be studied, and the system of management amended accordingly. As a general rule, if the air-cell dries down in accordance with the diagram supplied with the usual book of instructions it may be taken for granted that the desired ventilation and moisture are being obtained.

#### HATCHING-PERIOD.

I would again emphasize the importance of putting the last of the eggs into the incubator before September has gone, even in the case of the lighter breeds. All chicks of the heavier breeds should be in the brooder by September at the latest. Where the natural mothers are depended upon the difficulty of securing broodies at the right time is becoming more acute each year. As the egg type advances the broody tendency weakens, so that the more profitable the stock from an egg-laying view-point the greater the difficulty of obtaining broody hens. The most popular breed at the present time is the White Leghorn, and with the best egg types of this breed broodiness has almost disappeared. Even with the improved strains of the heavier breeds the tendency to broodiness is weakening, and even where with this stock broodies may be depended upon they become broody too late for the hatching of winter layers. Where the plant is on a small scale and an incubator is not used the difficulty is a vital one. There are two alternatives—either to keep some show types of the heavier breeds, or to arrange to have the eggs artificially hatched by men who have the necessary plant. Then there is the possibility of securing stock as day-old chicks, and this is by no means to be despised, especially when the supplier is a man of repute, and will furnish a fireless brooder with the chickens.

## CONDIMENTS.

In these days of recognition of the importance of simplicity of diet and the ill effects of quack nostrums it is surprising that some poultrymen are not content with providing their fowls with a liberal and complete ration, but have recourse to condiments and questionable stimulants in order to encourage the egg-yield in the colder months of the year. In the first place, the power to produce eggs is an hereditary character, and to enable a bird to yield to her maximum capacity it is only necessary to maintain her in a healthy condition, and to supply her with the food required for the manufacture of her artificial product. The other day I was asked to advise a man as to serious mortality in his flock, as a number of his fowls had died, and more were apparently preparing for the end of their existence. He admitted that notwithstanding a good warm mash in the morning, meat at mid-day, and wheat at night, he was supplying mustard and pepper in addition to a special spice. That mortality had taken place did not surprise me. The condiment stimulates the egg-producing organs, but the effect is brief, and the reaction which sets in not only defeats the end in view but undermines the constitution, with, as in the case quoted above, a complete breakdown and subsequent death. The best testimony we have to the futility of condiments to stimulate egg-production is that the high records put up at the laying competitions are established without their aid. The condiment is the refuge of the amateur, and the bugbear of the practical man. That a fancier tunes his birds up for a show by these stimulants is no argument in their favour. Observation of the condition of many show birds after a show should be conclusive enough evidence that they are unnatural and dangerous.

## CLEANLINESS.

One of my unpleasant experiences—and it is far too common—is to become covered with vermin on entering a fowlhouse in order to give advice in regard to the plant and the stock. A man desirous to learn how to advance in his methods and to extend his operations is hardly likely to succeed if he fails to appreciate in the first place the necessity of cleanliness in all that pertains to poultry. Science has rendered great service to the dairy-farmer, but its greatest service has been directed to overcoming defects arising from dirt; and, nowadays, it is being realized that the old secret of dairying—"cleanliness"—is the modern secret. If this be true of dairying, it is even more true of poultry-keeping; for with poultry dirt means disease, and poultry-disease comes under the heading of those things which cannot be profitably cured. Unless the poultryman realizes the necessity of cleanliness as the foundation-stone of success, he need not hope to be able to conduct the business on a commercial scale.



## REARING UNDER THE HEN.

It has already been emphasized in these pages that when the natural method of rearing is adopted every care should be taken to protect the hen and her young ones and to provide against accidents. One or two points bear emphasizing. In view of possible wet weather a board floor should be provided for the coop, so that the chickens may be kept off the ground. When the hen is confined she cannot protect her chickens as she would like, and this should be remembered. Again, when the chickens are hatched any board surrounding the nest should be removed, so that the chickens can get under the hen with ease. I saw a case the other day where a special sitting of eggs was put in a box for the hen, with the result that when the chickens were hatched and managed to get out of the nest a number of them perished by being unable to get back again. The front of the box should be removed so that the nest may always be accessible. The best plan is to make the nest on the ground; and if a box is used the bottom should be taken out of it. Many a chicken has been drowned by jumping into a deep water-tray. Minimize this risk by placing a brick or stone in such water-receptacles.

## BROODING QUESTIONS.

I attach great importance to having a fresh run for the chickens when they leave the brooder—a run that has been spelled for some time. It is invariably the case that chickens will come away much more rapidly on such a run compared to what they will on stale ground and grass.

Every care should be taken to make houses fit to receive young stock and to guard these latter against receiving any set-back. The houses should be thoroughly sprayed with a good disinfectant, and be otherwise made as sweet and clean as possible.

Do not on any account overcrowd chickens. It is one of the mistakes which never fail to make trouble, more especially when the chickens have not been gradually hardened off in the brooder. If chickens are seen to be crowding on top of one another in a corner trouble may be safely anticipated. The crowding induces sweating, and from this the young ones seldom recover or develop into good stock. A good preventive of this trouble is to make a temporary hover, this being placed several inches away from the walls. It is merely a large wooden cover on legs with a curtain of sacking around the four sides and hanging about 2 in. from the ground. In a cool brooder-house it is always well to have the corners rounded off with wire netting, so that in the event of crowding fresh air may be available to the chickens at the back.

A rather common trouble with chickens in the brooder is the formation of balls of earth, &c., on the feet. This is mostly found in brooders where the conditions are not ideal—especially in the matter of temperature. If the chickens are not comfortable and they are induced to huddle, the bedding gets away from them, and, there being no absorptive material under them, the droppings adhere to their feet. The best remedy is to remove the cause by supplying the desired heat and providing some dried earth or other good absorptive material on the floor. To remove the balls the only thing to do is to run the chickens for a short time on wet grass, or give them access to a very shallow tray of water. To attempt to remove the matter with the fingers generally means injury to the tender feet.

#### PEDIGREES OF PERFORMANCE.

The feature of Australian methods of breeding which appealed most forcibly to me was the great care exercised by the successful producers of utility stock in the Commonwealth in ascertaining the exact producing-capacity of their breeding-stock. Pedigree of performance is valued as it should be. The trap nest is considered obsolete, and nothing is used but the single pen. I saw more single pens in a day in Australia than could be seen in the whole of New Zealand. The record-book is carefully kept. This tells the egg-record of every hen in the breeding-pens as well as that of the dams of the male birds. There is no haphazard work. The breeder knows exactly what he is doing. Padman, the great South Australian breeder, declares he has no secret test to guide him. Some of the best sires he has bred would not take a lead-pencil between the pelvic bones. He works absolutely to performance, and never loses sight of constitution. Of course, when a man breeds on these sound lines he must come to the evolution of the desired type of an egg-producing breeder.

#### THINGS TO REMEMBER.

Overcrowding is one of the most fatal mistakes made by poultrymen

Don't have a special season for culling. Cull all the time.

Don't have too many breeds. One or two are sufficient if you mean to improve the stock.

A poultryman's methods can generally be judged by the appearance of his fowls.

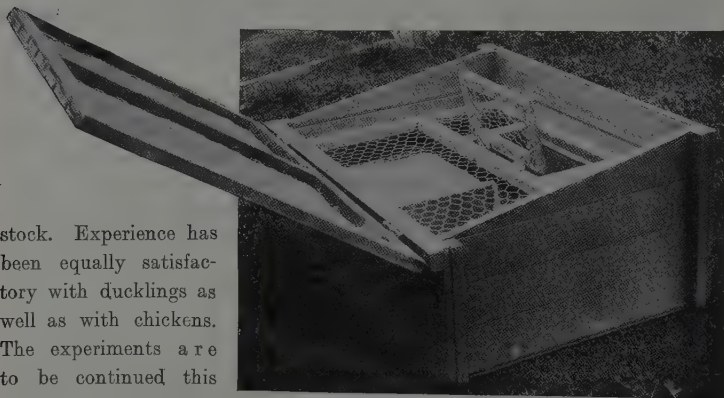
The poultry section of the Ruakura Farm of Instruction has sent out this season 476 sittings of eggs.

Consider the prices of the different kinds of grains. Feed those that will return the greatest net profit, not necessarily the largest number of eggs.

## THE COOL BROODER.

A. CARR.

THE rearing of chickens by means of a cool, or fireless, brooder has now been proved, at the Milton Poultry-station to be quite successful in practice; in fact, the results by this system have been most satisfactory. The chickens developed well and grew into vigorous, profitable



TOP VIEW OF COOL BROODER.

stock. Experience has been equally satisfactory with ducklings as well as with chickens. The experiments are to be continued this season. I would strongly advise using the best woollen

blankets and not cushions of wadding, &c., as the chickens, in my experience, never sweat with the blankets. I would suggest the following size for the brooder for thirty to forty chickens, it not being advisable to put more together: Brooder, 36 in. by 32 in.; front, 18 in.; back, 12 in.; hover-box, 20 in. square and 8 in. high; the top of this rests on three strips. The first ten days the top should be 4 in. off the floor, after which it should be raised to 6 in. The  $\frac{3}{4}$  in. wire-netting frame is 9 in. off the floor, and has a wire door through which to feed and water, the frame preventing the chicks from flying out whilst doing so. The front of the hover-box is open, 6 in. by 5 in., with a curtain hanging down. Corners should not be allowed, and to prevent these strong cardboard bent round and tacked against the sides will answer, but it must come up to the wire-netting frame, or the chicks will get over and die from cold. If there are any corners the chicks are sure to crowd into them and get smothered.



THE BROODER SHOWING THE METHOD OF PRODUCING WARMTH.



THE BROODER, WITH RUN ATTACHED.

## CO-OPERATIVE EXPERIMENT RECORD.

## WEST COAST, SOUTH ISLAND, EXPERIMENTS.

A. MACPHERSON.

## REPORT ON RESERVES SECTION 26, POERUA, CONTAINING 5 ACRES 2 ROODS AND 35 PERCHES, RESERVED FOR EXPERIMENTAL PURPOSES.

ON the 20th March last this area was inspected. Many years ago one of the settlers in the district ring-fenced the reserve, felled the bush, secured a good burn, sowed grasses, and grazed it with stock until taken up by the Department. One acre of this has been stumped and cleared at a cost of £25. The land is now being ploughed, and will remain in open fallow until spring, when experiments of a character suitable to the soil, climatic conditions, and of educational value to the settlers will be initiated.

## REPORT ON 5 ACRES RESERVED FOR EXPERIMENTAL PURPOSES, SECTION 2891, BLOCK V, BRUNNER SURVEY DISTRICT, NEAR MŌANA RAILWAY-STATION.

This area was inspected on the 20th March last. When taken over it was in bush, which has been felled, but the burn, like all others on the West Coast this last season, was a poor one owing to too much rain and too little sunshine. Consequently the area is not in a fit state at present for experimental work.

Owners adjoining who felled bush and who likewise had a bad burn propose to sow with cocksfoot now and allow it to ripen next summer, then fire the cocksfoot, which they say will be the means of conveying the fire through the unburnt bush and getting a satisfactory burn. I do not consider it advisable to adopt this means of securing a good burn next summer. By sowing with cocksfoot this would upset our arrangements for experiments on the area with plots of varieties of grasses, as the fire would not destroy the cocksfoot. I am of opinion the best way to deal with it will be to make heaps of the cut bush and burn in that way, at same time cutting the stumps of small growth level with the ground and burning them.

## REPORT ON EXPERIMENTS IN GRASSING HILLY COUNTRY CARRIED OUT ON MR. MARKS'S FARM, INSPECTED ON THE 18TH MARCH LAST.

No sowings of grasses will be done this autumn, as the portion of the bush land now left is too rough—large roots and broken country—to sow with any degree of success individual plots of grasses thereon. The small area left is now, however, being sown with a mixture of grasses similar to the 9 acres sown last year, and Mr. Marks undertakes to fell an area of bush land in the same gully and adjoining the present plots on the western side, burn and fence in same at his own cost, the land to be ready for sowing next spring or summer.

On the 18th March last an inspection was made, the following being particulars noted regarding the respective grasses and forage plants sown at different periods—viz., 27th March and 6th October, 1911.

*Grasses, &c., surface-sown on 27th March, 1911.*

Plot.	Variety.	Remarks.
1	Meadow fescue .. ..	Only to be seen in small patches.
2	New Zealand tall fescue ..	Very little; a few patches.
3	Wood meadow-grass .. ..	Looking fairly well; plants vigorous.
4	Cocksfoot .. ..	Gradually disappearing.
5	Smooth-stalked meadow-grass ..	Doing very well.
6	Lucerne .. ..	Dead.
7	Crested dogstail .. ..	Very patchy and spindly growth.
8	Greater or marsh birdsfoot trefoil	Splendid growth; does well on all marsh lands on West Coast.
9	Sheep's burnet .. ..	Growing in patches.
10	Rhodes grass .. ..	Dead.
11	Timothy .. ..	Looking exceedingly well; plants very healthy.
12	White clover .. ..	Splendid all over plot.
13	Rough-stalked meadow-grass ..	Looking very well.
14	Yarrow .. ..	Splendid growth.
15	Fiorin .. ..	Thick growth, and plants vigorous.
16	Alsike .. ..	Almost disappeared.
17	Meadow foxtail .. ..	Only to be seen in small patches along plot.

*Mixture of Grasses, &c., Surface-sown.*

*Plot 1.*—Looking well, most prominent being timothy, white clover, and greater birdsfoot trefoil.

*Plot 2.*—Doing very well, most prominent being timothy, white clover, chicory, and greater birdsfoot trefoil.

*Grasses, &c., surface-sown on Northern Aspect of Gully on 6th October, 1911.*

Plot.	Variety.	Remarks.
1	Cocksfoot .. ..	Very patchy; almost disappeared.
2	Lucerne .. ..	Disappeared.
3	Meadow foxtail .. ..	Unsatisfactory; patchy growth.
4	Crested dogstail .. ..	"
5	Rough-stalked meadow-grass ..	Very fair growth.
6	Smooth-stalked meadow-grass ..	Fair growth, but patchy.
7	Meadow fescue .. ..	Patchy, but plants vigorous.
8	Tall fescue .. ..	"
9	Timothy .. ..	Splendid, healthy-looking growth.
10	Yarrow .. ..	Splendid growth.
11	Alsike .. ..	Almost disappeared.
12	Greater or marsh birdsfoot trefoil	Splendid growth.
13	White clover .. ..	"
14	Fiorin .. ..	Doing better than all other grasses.
15	Wood meadow-grass .. ..	Rather patchy, but plants vigorous.
16	Sheep's burnet .. ..	Patchy, but good healthy growth.
17	Rhodes' grass .. ..	Doubtful.
18	Awnless brome-grass .. ..	"
19	Chicory .. ..	Only odd plants to be seen.
22	Boyd's clover .. ..	A few isolated plants only.

*Mixture of Grasses, &c., surface-sown.*

*Plot 1.*—Doing well, most prominent being timothy, greater birdsfoot trefoil, white clover, and rough-stalked meadow-grass.

*Plot 2.*—Doing well, most prominent being timothy, yarrow, white clover, cocksfoot, and chicory.

The area of 9 acres on both aspects of the gully sown with a mixture of grasses, &c., has done well, there being a thick growth all over. However, owing to heavy rain falling on the day of inspection, it was impossible to make an exhaustive examination as to which varieties of the grasses sown were most prominent in growth.



## SOME EXPERIMENTS WITH OATS.

G. D. S. BAYLIS.

Experimenter.	Description of Soil.	Variety of Crop.	Cultivation.	Date sown.	Seed per Acre.	Manure per Acre.	Harvested.	Yield per Acre.	Remarks.
Shaw and Son, Masterton	Good loam on medium sub-soil	White Ligowo (Swedish)	1911. Ploughed early ..	1911. Sept. 11	Bush. 3½	N o n e.	1912. Feb. 12	Bush. 106 First Seconds 14	A well-grown sample.
W. Cameron, Masterton (a)	Deep alluvial	White Ligowo (Swedish)	Ploughed June and Sept.; cultivated twice in Sept.; disced once, harrowed twice	" 11	4	N o n e.	Jan. 26	First Seconds 8	No signs of rust or shanking out.
E. Harper, Masterton (b)	Light loam, lighter sub-soil with shingle	Ditto	Ploughed Aug. 14; harrowed twice, Aug. 30; harrowed Aug. 31; rolled Oct. 7	Aug. 31	3	No manure; 1½ cwt. W. M.E. used with previous swede crop	Feb. 3	First Seconds 22	Free from rust or smut.
Ditto	Ditto	Victory (Swedish)	Ditto	" 31	3	Ditto	" 6	Straw 38 cwt. First Seconds 24	Ditto.
"	"	Beardless Prop-steier (Swedish)	"	" 31	3	"	" 11	Straw 38 cwt. First Seconds 20	"
B. Chambers, Havelock North	6 in. loam on porous clay subsoil	Victory	Grass ploughed under July; disced three times, harrowed twice, July; harrowed and rolled after drilling	" 1	2	2 cwt. super. and bone..	Jan.	16 bush.	Owing to wind and dry weather a very light crop; not a fair trial.
Ditto	Ditto	Beardless Prop-steier	Ditto	" 1	"	Ditto	"	30 "	Ditto.
"	"	Black Great Mogul	"	" 1	2	"	"	24 "	"
R. Urquhart, Runciman	Brown loam on stiff sub-soil	Oat manual experiment	Land ploughed out of fern and followed twelve months; ploughed in April and twice harrowed and twice disced. In May harrowed, drilled, harrowed, and rolled	Early in May	3	Mixture 1: 75 lb. super., 38 lb. bonemeal, 17 lb. sulph. pot., 25 lb. gypsum, at the rate of 300 lb. per acre. Approximate cost, 16s. per acre	Dec. 20	1 ton 17 cwt. 2 qt.	Height, 4 ft. 3 in.; quality, good; rust, none.

[illegible]

### EXPERIMENTER'S NOTES.

(a.) Whether this is an exceptionally good year for oat-yields or not, this has been the best result I have experienced in twenty-five years.  
(b.) Notwithstanding high winds, for a long period all plots stood up well, and very few outs were shaken out. November and December, being very windy months, checked the growth. I am autumn-sowing 6 acres of Ligoivo, and another 5 acres in spring, also 10 or 12 acres of Victory.  
(c.) A good variety.  
(d.) Think it equally suited to poor land.  
(e.) Did not do as well as others.  
(f.) Slag mixture gives best return.

## PASTURES AND CROPS.

## JULY.

OHAEAWAI.—The weather in July was truly wintry, the cold having been more intense than was experienced for many years. This has had a very telling effect on the stock in the cold localities, where bush assists to chill the atmosphere much more than on the warm volcanic soils, which also have the advantage of yielding more fodder to keep up the condition of animals. Rain fell on fourteen days, the heaviest downfall being on the 27th, when mother earth received a deluge of 1.92 in. The district is now provided with the necessary moisture for some weeks, and every one would welcome a steady warm and dry spell to last us well into spring.—*W. J. Dunlop.*

WHANGAREI.—The weather during the past month was dry, but very cold until the 23rd, when it commenced to rain. As it continued to rain without interruption until the 28th, the whole district was flooded. The cold snap in the beginning of the month has thrown the growth of pastures back, the grass sown in autumn and the oats having particularly suffered by the cold frosty weather.—*A. P. Speedy.*

AUCKLAND.—The past month was a fairly wet one. Frosts were common, followed by an unusual spell of cold weather, which had a tendency to check the growth; still, where a liberal top-dressing of manures had been applied, the pastures show a splendid growth. There is plenty of feed so far available for stock, which are in very good condition, particularly the dairy cows. The turnip and hay crops have been exceptionally good in the Auckland District. Farming-operations have been hindered; ploughing cannot be gone on with owing to the wet state of the land. When the weather clears up there will be a rush to make up for lost time.—*R. Rouan.*

TE AROHA.—The beginning of July having been exceedingly wet, ploughing was retarded owing to the sodden state of the land. The latter part of the month was frosty, with sunny days and cold winds. Thanks to good root crops and abundant supply of hay, stock generally are looking remarkably well. So far the calving season has been good, and cows on the whole appear to be healthy, which augurs well for a successful milking season.—*J. L. Morris.*

HAMILTON.—July was an extremely wet and cold month, with but few fine days. The roads in the district are in a bad state; this will be, if the weather does not improve, a great drawback to the suppliers of the dairy factories at the beginning of the season. Farming-operations are practically at a standstill owing to the wet season, which is also the cause of the bad state of the pastures. Stock are being fed on turnips and hay, and are in good condition for this time of the year.—*J. Kerr.*

CAMBRIDGE.—The weather in July was very wet and boisterous, with cold winds; fine days were few and far between. There were five frosts during the month. As the root crops are good, and a quantity of hay available, plenty of feed for the rest of the winter is assured. All classes of stock are in good condition.—*A. A. Clapcott.*

OPOTIKI.—The weather during the past month was very boisterous. On the 30th the severest frost of the season was experienced, which checked the growth of feed considerably. Stock throughout the district are in fair condition. Maize-plucking has been completed, and some very good crops have been obtained.—*J. Case.*

TE KUITI.—Excepting a few fine days following very heavy frosts, the weather last month was exceptionally wet and cold. Some of the heaviest and coldest rains experienced this winter occurred during the month. Pastures are now bare, and hay, mangels, and turnips are being fed liberally to stock in the dairying districts.—*B. Bayly.*

GISBORNE.—The weather during the month of July has been very unsettled, being cold and wet, with a few frosts, and a little snow on the higher levels. The latter soon disappeared. Pastures are fair throughout the district, and at present there is a good growth of young grass. There are fine crops of pumpkins on the Gisborne flats, and they are being fed to stock. Mangels are also used for the same purpose, but not to so great an extent.—*William Ross.*

**HASTINGS.**—The weather experienced here this month was wintry to an unusual degree. The rain was heavy and general on the low country, with heavy falls of snow on the ranges. The soil here requires a good soaking about this time of the year, and in the coming spring I anticipate a record growth. Stock have withstood the ordeal very well, which may be partly attributed to the fact that most of the farms are understocked. Sheep are selling at high rates, and if the spring growth comes up to my anticipations still higher prices for sheep and cattle may be looked for.—*J. G. Parker.*

**Wairoa.**—The weather-conditions during July were of a variable character. Notwithstanding the fact that the latter half of the month was wet and wintry, the pastures still continue to make fair growth. A good percentage of early lambs were to be seen throughout the county. Ploughing-operations for future cropping are general in the district. Stock of all classes continue to hold their own, and the outlook from a settler's point of view is encouraging.—*T. F. Mullaly.*

**PAHIATUA.**—The weather last month was cloudy, with very little sun and a fair amount of rain. Though agricultural work was considerably retarded by the weather, the rainfall may nevertheless be regarded as a blessing, as it followed two seasons of drought. Rain fell on seventeen days. Pastures are, generally speaking, very bare; there is a fair amount of green feed coming on, which is looking fairly well, as also do oats.—*T. Bacon.*

**WAIPIKURAU.**—July was very cold and wet; there were two fairly heavy falls of snow, also several hard frosts. The grass-grub should suffer considerably. Stock appear to have weathered fairly well. Pastures show practically no growth.—*H. O. M. Christie.*

**MASTERTON.**—It rained nearly every day during the past month, which is said to have been the wettest July known for many years. All farm-work has been at a standstill, notwithstanding the good condition of the pasture, especially on the higher country. If any proof of the value of ensilage and hard fodder were needed, it would have been given during the recent rough weather, when feed was short and several paddocks were under water for some days; nevertheless the farmers were able to keep up the condition of their stock by means of extra fodder. The Masterton farmers are now alive to the value of winter feeding, and in most cases a good supply of this is kept. The recent heavy rains have done some good in the destruction of grubs.—*T. C. Webb.*

**NORTHERN WAIRARAPA.**—The past month was particularly wet, with a total rainfall of 15.84 in. It kept on raining practically all the month, and farm-work has therefore been at a standstill for a considerable time. Although there has been a southerly with heavy rains, there is to be seen a slight growth in the grass; given a fortnight's fine weather, there would soon be evidence of spring. Stock that have not been receiving winter feed are not looking overbright.—*J. S. Rankin.*

**CARTERTON.**—The weather during the past month was exceptionally severe, the oldest settlers state such continuous heavy floods have not been experienced in this district for many years. A large area of the flat country was completely covered with water; in the lower valley the country was a sea of water for miles, the scrubs and fences being in places completely covered. Early in the month the Tararua Ranges were covered with snow; then came heavy rain from the north, which brought the snow down and flooded the country. The floods had the good result of destroying completely the grass-grub, which had been prevalent in many cases.—*S. C. Ivens.*

**WELLINGTON.**—Mild, hazy weather was experienced up to the middle of the second week, encouraging a growth, but since the 10th of the month an almost continuous intensely cold southerly blizzard with heavy rain has raged, flooding all low-lying lands, and blighting vegetation with its icy breath. Milking-cows and young sheep have suffered considerably, and agricultural operations are suspended.—*G. H. Jenkinson.*

**NEW PLYMOUTH.**—From the beginning of July to the 19th rain fell incessantly, followed by much colder weather and heavy gales of wind. During the last week the weather improved, there being slight frosts at night, followed by bright, sunny days. All farm-work has been retarded by the wet. Farmers are now busy top-dressing their pastures and ploughing. There is now little grass on pastures, but this winter most farmers have made ample provision for their stock.—*R. E. Fairfax-Cholmeley.*

**HAWEERA.**—The weather was wintry throughout the past month, the rainfall being above the average for July. Rivers and creeks have been in a swollen condition, but no damage from floods has been reported. At time of writing a pleasant change has taken place, and clear frosty weather is now prevailing. Notwithstanding the severity of the weather the country is looking well, and stock are in much better condition

than at this time last year. A few lambs are now to be seen, and a good lambing is expected.—*A. J. Glasson.*

OHAKUNE.—July opened with a heavy fall of snow, varying in depth according to location and elevation, followed by fairly heavy rains of a mild character; the snow disappeared after a short duration. Snow having again fallen on the 22nd, the month ended with exceptionally fine weather. Rain fell on eighteen days. Farmers entertain hopes of an early spring, present indications in this district pointing in that direction. Judging by the amount of clearing and stumping done this winter, the area fit for the plough will be materially enlarged; present conditions are favourable to agricultural pursuits. Owing to the lesson taught by the severity of last winter, farmers have avoided overtaxing their carrying-capacity, consequently all classes of stock have so far wintered well, particularly so on holdings where occupiers have made provision for winter feed. Dairy cattle and breeding-ewes look remarkably well.—*P. Barry.*

MANGAWHEKA.—The weather during the past month was wet, sunless, and cold; but on the whole seasonable. A heavy fall of snow took place on the 23rd on the fairly high country; there was a depth of 8 in. The land is now thoroughly saturated with moisture. Grass is practically of no feeding-value, but stock of all kinds are in tip-top condition. There are distinct indications of an early spring setting in. Willows have shown a green appearance for some time. So far there has been very little frost.—*J. A. McIrose.*

FEILDING.—The total rainfall during the month of July amounted to 4.58 in., accompanied by a heavy fall of snow on the 24th in the Kiwitea and Pohangina Counties, which should prove beneficial in checking grass-grubs and other orchard pests. Threshing, ploughing, and seeding operations have been at a standstill, owing to the inclemency of the weather; still, there is every indication of an early spring.—*W. Dibble.*

STRATFORD.—July was a very wet and unsettled month; a few fair days alternated with squally weather accompanied by sleet, snow, and frosts. Very heavy rain fell from the 15th to the 18th. Pastures offer a fair amount of feed, though they show but little growth.—*A. F. Wilson.*

NELSON.—The weather during July was broken and stormy. Heavy rain fell on the 5th and 9th; on the 15th it was wet in the morning, and early in the morning of the 16th a strong gale of wind came up, which did a deal of damage to some of the trees in the city. Though the wind moderated, the rain continued for some days. The weather for the last few days has been beautifully fine, with hard frosts at night, which will check the growth of both grass and crops. Oats are looking well, and the farmers are busy, ploughing their land and getting it ready for sowing spring wheat and barley. Fine weather is wanted for several weeks.—*G. J. Ward.*

HOKITIKA.—July was fine and frosty, and quite a change from the almost continual wet weather experienced since October last. Owing to the most suitable climatic conditions rabbit-poisoning was very successful in South Westland this season. Seed for stock is scarce, but cattle, &c., are in fair condition, and seem to thrive well through the severe winter months by feeding off the native shrubs in bush lands, returning again to the open country in the spring.—*H. J. Wallon.*

BLENNHEIM.—The past month was the coldest, wettest, and most stormy month experienced in this district for some years. The first three or four days began with heavy frosts, which were succeeded by almost continual rains and high winds. As the rivers have been in constant flood, and many low-lying farms inundated, farming-operations were delayed in consequence.—*F. H. Brittain.*

SEDDON.—The first five days of July were warm and sunny, with severe frosts during the night. From the 6th to the end of the month strong storms were experienced, with heavy falls of snow and rain alternately. Settlers agree that the past month was the worst one for years. Stock are beginning to show the effects of the rough weather.—*E. T. Sinclair.*

ROTTERHAM.—The month of July commenced with rather mild weather, accompanied by slight frosts at night. These conditions prevailed more or less until the 10th, when heavy rain set in, which lasted for some days, rivers and creeks being in very high flood. This was followed by snow; then rain again commenced, and continued for some days, again followed by a very heavy fall of snow, which has done considerable damage to telegraph-lines, &c. It is reported to be very severe in the back country of Hammer Springs, and stock there must suffer very badly. At time of writing we are having very severe frosts, and if this continues long stock must suffer severely. The total rainfall for the month was 13.3 in., which constitutes a record for July for this



district. Rain fell on sixteen days altogether. Old residents here consider this month has been the worst ever they remember.—*W. M. Munro.*

KAIKOURA.—The weather during the first week of July was fine; but in the last three weeks there has been an exceptionally heavy fall of snow on the higher country, and a heavy rainfall on the lower. Old residents here state it has been the worst weather for a great number of years. There is every likelihood of there being a heavy mortality of sheep out on the snow-covered country. Pastures are bare.—*William S. Goodall.*

RANGIORA.—The weather during July was exceedingly wet, and a great part of the low-lying country was flooded. The rainfall for the month was 7.72 in., and the total sunshine 79 hours 40 minutes. A peculiar feature of the temperature during the fourth week was that it was never higher than 41° and never lower than 31°. Frost occurred on eighteen days, and snow fell heavily on the high country. The low-lying country was flooded in several parts, and the continuous rain prevented winter sowing in many places. Farmers will therefore be very busy in order to get the ground ready for the seed in the spring. This should raise the price of good working-horses.—*J. A. B. Hughes.*

ASHBURTON.—Fine weather was experienced during the first week of July; afterwards wet weather prevailed, with heavy snow on the back country, the snow lying also on the plains for a good distance below the hills. Rain fell on sixteen days, the total being 9 in. as compared with 5.6 in. for the corresponding month of last year; this gives a total for the present year of 23.88 in. as against 35.63 in. for the same period of last year. Lamb-fattening is now practically over; the local works close down on the 10th August, the slaughtering returns showing a shortage of about sixty thousand in comparison with last year's figures.—*C. Branigan.*

LINCOLN.—Fine weather prevailed during the first week of July, but during the rest of the month there were only four dry days. Stock suffered, but the abundance of winter feed proved a blessing. For the greater part of the month tillage-operations were completely suspended. Owing to this a considerable acreage, which had been intended for wheat, will now be sown in oats or other crops.—*J. G. Scott.*

TIMARU.—The weather was very bad during July. There were heavy rains and floods, with snow on the hill country; this has delayed threshing in many cases, and getting the grain into the market, and also stopped the sowing of winter wheat. A lot of land will now have to go into spring wheat.—*J. C. Huddleston.*

FAIRLIE.—July was a very wet month, so that all farm-work was practically at a standstill; however, the weather now seems to brighten up. All stock had a very bad time during the month, as the continual wet weather was nearly as bad as a heavy fall of snow. Farmers are very much behind with their work, and therefore hope that the fine weather now enjoyed will continue. A very large area of wheat will be sown this year, if the conditions should prove favourable.—*W. B. Manning.*

OAMARU.—July was an exceptionally wet month, rain having fallen on twenty-three days; in consequence the land is in a very wet and sodden state, and all farm-work at a standstill. Very little crop is in so far, and it will be some considerable time before the land will be in a fit state to work. Turnip-fields are in a very dirty state, and sheep on the "breaks" are not holding their own, much less fattening. Pasture is getting short in the paddocks, but feed is still good on pastoral country.—*S. M. Taylor.*

WAIMATE.—The past month was an almost continuous period of rain and flood, with snow on high country. The continuous wet weather has so retarded agricultural work that only a comparatively small area of winter wheat has been sown; it is therefore to be expected that the area of spring-sown wheat will be much greater than usual. Pastures are still fairly good, and a tendency to growth is perceptible; speaking generally, there is a fair amount of feed and sufficient to carry settlers along. Although the season could not well be considered favourable for root-growing, roots grown in connection with the co-operative field experiments show favourable results, and good samples of the various varieties were to be seen. Chou moellier increases in popularity, as does lucerne; the season has not been favourable for the growth of the latter, but some very fine areas of chou moellier are noticeable, and it is very highly spoken of as a fodder by the respective growers.—*F. A. Macdonald.*

KUROW.—The weather throughout the past month has been wet and cold; but there is no great depth of snow on the back country, and the death-rate of sheep has been very slight so far. There is very little frost in the ground at present, and indications point to an early spring in this locality.—*G. Reid.*

DUNEDIN.—The weather during July was rough and unsettled, with a large amount of rain; farm-work has thereby been greatly hindered. The pastures on the Otago



Peninsula show already some green, and the conditions would soon improve if the weather were to brighten up now.—*J. R. Renton.*

**SUTTON.**—The first week of July was mild, the rest of the month, generally, wet and cold. The wet state of the land has considerably retarded agricultural work, but with a favourable spring the Strath should have a good season ahead of it. Turnips, which were extra good, are lasting well, and consequently stock are coming out of the winter in good condition. The Rock and Pillar Range has a heavy coating of snow at the present time.—*W. Scott.*

**PALMERSTON SOUTH.**—Up to the evening of the 10th the weather was fine, although cold. Heavy rain then set in, and rivers and creeks were all in flood the following day. Since then it has been exceptionally wet, rain falling on seventeen days. The land is now in a very wet state, and farm-work is at a standstill. The feeding of turnips to stock is rendered difficult. Farmers in Macrae's, Moonlight, and Green Valley districts, where no threshing has yet been done, experience a want of straw for their stock. It is expected that the recent rains will do an immense amount of good in destroying the grass-grub.—*C. S. Dalgliesh.*

**MOSGIEL.**—During the month of July rain fell on eighteen days. The heaviest rainfall was on the 10th and 11th; it caused a flood in the Silverstream, which covered all the low-lying land. The Taieri River was bank-high, running over the approach at Outram Bridge; the flood did not, however, cause any damage. It is still raining, and parts of the Taieri Plain are covered with water. Farm-work is at a standstill. It will be difficult for farmers to prepare their ground for the coming season if the bad weather should continue. Turnips are plentiful, and stock is scarce. Pastures and green feed are looking well for the time of the year. There has been very little frost during the month.—*H. McLeod.*

**CLYDE.**—During the month of July some severe frosts were experienced, also a good deal of rain. On high tops snow is very plentiful; but, taking the rough country on the whole, conditions are satisfactory.—*Thomas N. Baxter.*

**NASEBY.**—The weather was changeable throughout the month. There were heavy rains and a good many days of snow and sleet showers; also in the latter half of the month some very hard frosts. The ground has now had a good soaking; given a warm spring there will be abundance of grass. Harvest is not yet finished in the Paerau district, and there are still some paddocks in stock. Stock are keeping in good condition.—*A. T. N. Simpson.*

**LAWRENCE.**—The rainfall was exceptionally heavy last month. There were also some severe frosts and several light falls of snow. Farm-work of all description is hindered, a good deal by the softness of the ground and the rain. Stock of all kinds are wintering very well. The turnip crop is holding out satisfactorily.—*R. Barron.*

**INVERCARGILL.**—July has been a fair winter month. The rainfall has not been excessive, and we have had frosty nights with fine days during about half the month; consequently better progress has been made with ploughing. Rain fell on fifteen days.—*J. R. Whyborn.*

**OTAUTAU.**—The weather of last month showed considerable improvement. A succession of hard frosts is cutting down the winter feed. Still it is preferable to the constant rain experienced in June. Farmers are busy with their ploughing, and, if fine weather continues, will make up for lost time in sowing, though the land is still very wet in places.—*H. F. Dencker.*

**GORE.**—During the greater part of July the weather was favourable, and a good deal of ploughing has been done; but towards the end of the month it was wet for several days. I do not know of any wheat having been sown so far, and it is almost certain that next season's harvest will be late also. Turnip crops are feeding off well, and should last well on into the spring.—*B. Grant.*

**QUEENSTOWN.**—The weather experienced during the past month must be described as good for July. There were severe frosts with bright sunshine throughout the day, and at intervals of about a week an odd wet day with light coatings of snow on the tops occurred. The absence of fog here, which is so prevalent further down the central districts, is very noticeable. Agricultural work generally is practically at a standstill at present.—*A. Clarke.*

**LUMSDEN.**—During the early part of July we experienced fairly good weather, with a fair amount of sunshine. From thence on till the end of the month we have had real wintry weather, with snow, hail, rain, and very heavy frosts. All farm-work is considerably behindhand, very little ploughing being done. In many places potatoes remaining

in the ground were unable to be lifted on account of the frost. The turnip crops still remain to be eaten off.—*W. S. S. Cantrell.*

PEMBROKE.—July was very changeable. A good portion of the first part of the month was chiefly composed of wet, damp, cold weather, with occasional light snowfalls on the higher country. Very heavy frosts then set in, with occasional short breaks. The weather, although considered seasonable, has been much more severe than usual; at the same time, up to the present, the winter has been a favourable one from the farmers and pastoralists' point of view.—*J. A. Griffith.*

## THE FRUIT CROP.

OFFICERS of the Orchards, Gardens, and Apiaries Division report as follows regarding orchard conditions during the month of July:—

WHANGAREI.—The weather has been cold and wet throughout the month. Winter work in the orchards is fairly well in hand. Peaches are very much affected with *clasterosporium*. Most varieties of oranges are showing a full crop.—*J. W. Collard.*

AUCKLAND NORTH.—A wet and cold month. Growers have been spraying with red oil and Montauk. Pruning is well in hand. Peaches showing evidence of early spring. Port Albert apples still in supply, although prices lower than last year.—*W. C. Thompson.*

AUCKLAND SOUTH.—The month of July has been wet and cold, rain falling almost every day; owing to this, pruning and spraying were delayed.—*N. R. Pierce.*

HAMILTON.—Owing to July being such an exceptionally wet month orchard-work is not so far advanced as it might be. Pruning is still proceeding, but very little winter spraying has been done so far. Oil sprays are becoming popular in many parts of the district.—*T. E. Rodda.*

WANGANUI.—Winter operations in the orchards have been somewhat delayed by wet and cold weather. It is, however, seasonable, and, as the delay has not been serious, may be considered beneficial to cropping prospects. Early plum-trees for a week or two past have been heralding the coming spring.—*W. C. Hyde.*

POVERTY BAY.—Weather during the month has been very changeable; it was more or less wet, with occasional very fine days with a few frosts. In sheltered positions peaches are already commencing to show signs of life—unusually early; the danger will be a few late frosts. Spring spraying of peaches has just commenced, and the spraying of apples with red oil is in full swing, as also is pruning, where not already completed.—*W. R. L. Williams.*

MANAWATU AND WAIRARAPA.—Recent heavy rains stopped work in orchards considerably. Growers are busy pruning and spraying. Now better weather has set in. Much more attention is being given trees than in previous year.—*George Stratford.*

HASTINGS.—The continuous wet weather experienced throughout the month has greatly interfered with pruning and spraying operations. This work is now considerably behind. The position is all the more serious owing to the early swelling of the peach-buds, many varieties being very forward for the time of the year, owing no doubt to the absence of frosts. The trees generally promise well for next season's crop.—*J. A. Campbell.*

NELSON.—A great deal of wet weather has been experienced during the month, and a lot of pruning still remains to be done. A few growers have started spraying operations, but spraying is not yet general. Trees for the season's planting are now coming to hand in large quantities. There is still a fair supply of apples to be marketed.—*J. H. Thorp.*

DUNEDIN.—Pruning and planting is well advanced. Severe frosts during the past month have had the desired effect of keeping back the activity of the trees, which threatened to break into growth too early. All fruit-trees are showing a plentiful supply of flower-buds for the coming season.—*W. T. Goodwin.*

## WEATHER DURING JULY.

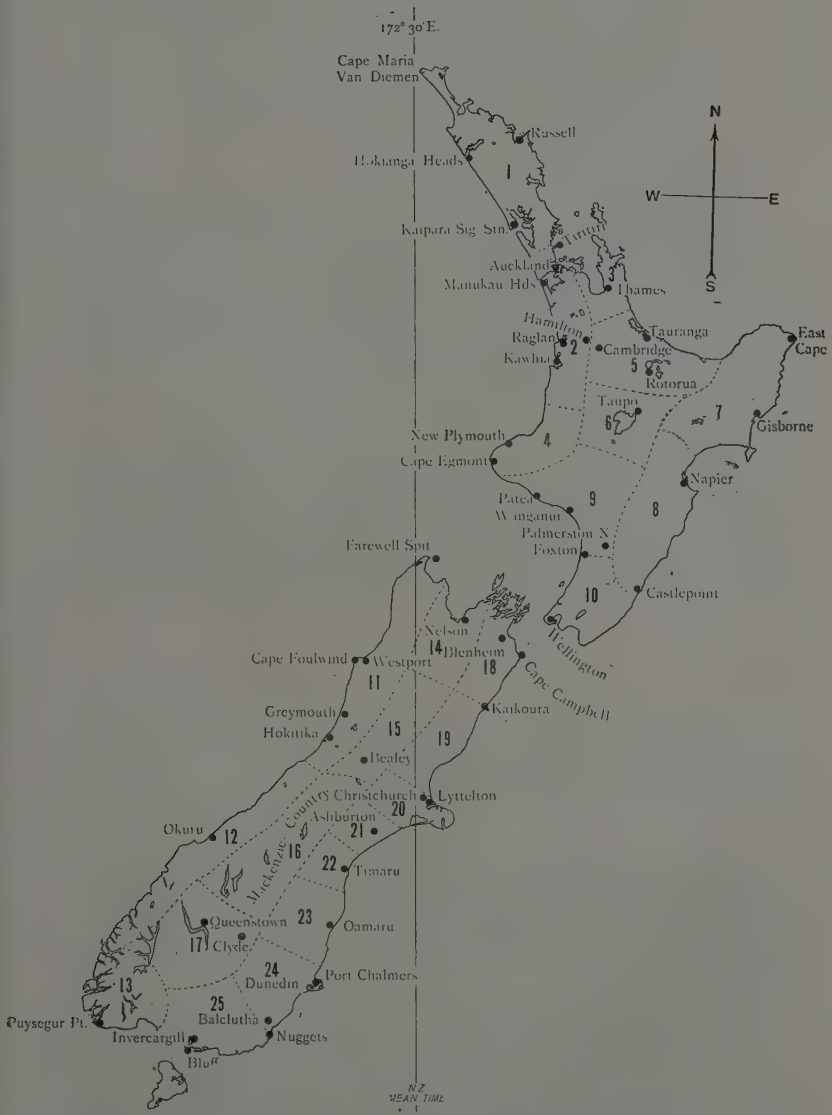
D. C. BATES.

## DISTRICT NOTES.

District.

*Chiefly from Telegraphic Reports.*

1. The extreme north had 50 per cent. above the average rainfall, but further south in this district the excess was but slight.
2. Rainfall about 75 per cent. of the average, although some stations recorded slightly above. Cold and showery weather prevailed, the mean temperature being slightly below the average.
3. Less than the average precipitation by from 20 to 40 per cent. Several hard frosts occurred, and the weather was cold but seasonable.
4. From the 9th to the 18th was the wettest portion of the month. During the rest of the month cold south-easterly winds prevailed, but only a slight amount of rain fell, the total for the month being from 10 to as much as 45 per cent. less than the average.
- 5, 6. About the average July rainfall, some stations recording slightly less and some slightly above. Cold southerly winds predominated, very squally at times, especially on the 11th, 15th, 17th, and 27th.
- 7, 8. There were many wet days, but no particularly heavy falls were recorded, and the total was from 30 to 50 per cent. less than the average northward of Napier, but about the average southwards, and at some places slightly in excess.
9. A cold and showery month with very little sunshine. The rainfall was about the average for July. Snow fell on the high country on several occasions, but particularly on the 23rd.
10. An excess of cold southerly winds and rain. Wellington City recorded the greatest total rainfall for July since 1858, when exactly the same amount fell during the month—viz., 10.08 in. At Wainui-o-mata Reservoir the total fall was 30.69 in., which constitutes the record monthly fall at this station since 1890, when records were first taken.
- 11, 12. Some heavy rain fell on the 5th, and cold and showery conditions prevailed generally between the 3rd and 15th, but thence to the end of the month most of the West Coast districts experienced fine and bright weather with cold nights and hard frosts. The total rainfall was less than the average at some stations by as much as 200 per cent., and in many cases it was exceeded by stations on the eastern side of the Alps, a condition which is exceptional at all seasons, and particularly in midwinter.
13. A predominance of fair weather was experienced in the latter half of the month, and generally the rainfall was light and below the average. The prevailing wind was from the east.
14. Precipitation in excess of average by from 20 to 50 per cent., mostly accounted for, in the first half of the month. Strong winds were experienced on several days, a very heavy gale blowing on the 15th. In the latter half of the month, although cold and squally at times, little rain fell.
15. The wettest day in this district was the 5th, but the month as a whole was unusually free from heavy rainfalls, although showery days were numerous, and some light falls of snow occurred on several occasions.



16. Fairly mild conditions prevailed until the 9th, after which until the end of the month the weather was cold and showery. Heavy rain fell on the 10th and 11th, and a considerable amount of snow fell during the month.
17. A very dry month, rainfall being much below the average for July. Mild weather until the 9th, but cold and frosty conditions prevailed from then until the end. Overcast skies and fog were much in evidence during the month.
18. More than double the usual rain fell at most stations, the greatest fall occurring mostly on the 15th. At Picton, on this date, a total of 7.72 in. fell, and on the following day at same station 6.30 in. were recorded, the total for the month reaching 25.03 in. Cold south-easterly winds prevailed from the 10th, and gales were frequent. On the 23rd, 26th, and 27th much snow fell on the high land.
19. From the 10th to the end of the month very cold and boisterous weather was experienced, snow falling on numerous occasions, causing considerable damage in parts. Precipitation was three times the average at many stations.
- 20, 21. The rainfall was generally in excess of the average, in some parts by as much as 300 per cent., especially inland, but on the coast the excess was not so much.
- 22, 23. South-westerly winds predominated in the latter half of the month, with cold weather, and snow fell on numerous occasions. The winds, however, were not usually of very great force.
- 24, 25. No particularly heavy rain fell, the total being usually below the average for this month by from 30 to 60 per cent. The weather was fair though cold, and strong winds were less prevalent than usual in this month. Numerous frosts occurred.

#### SUMMARY.

July is the midwinter month in New Zealand, and was this year remarkable for persistent easterly winds, which accompanied three prolonged disturbances which passed in the north, while the southern districts were under the influence of higher pressure. The weather was therefore very fine in Southland and Westland, but vapour-laden easterly winds deposited this moisture on the east coast of the North Island and the north-eastern districts of the South Island. The weather was very stormy at this period in Cook Strait. Conditions on the whole were raw and unpleasant. The lowest barometric pressure recorded was 29.40° on the 9th in Cook Strait, and 30.70° at Oamaru on the 23rd.

A renewal subscription, in stamps (2s. 6d.), for the *Journal* has been received at this office without any indication as to the sender. The letter was posted at Waitati on the 12th instant.

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The death of Mr. William Taylor, of Renfrew, has removed one of the most successful breeders of Clydesdales in Scotland. He owned, among other famous horses, Sir Everard, the sire of the well-known Baron's Pride, and grandsire of Baron of Buchlyvie. At the dispersal of his stud in February last one stallion made 1,600 guineas, and fifty-four animals averaged over £131.

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Five Victorian growers shipped to Britain Cleopatra apples from the same district through one agent, by the same boat. Of these, four received account sales ranging from 12s. to 20s. a case, while the other received returns of 6s. and 8s. a case. The exercise of extra care made the difference of an average price of 9s. a case being obtained. This approximately represents the difference in value between good grading and packing as against careless methods.—*Australasian*.

## COMMERCIAL REPORTS.

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### THE MEAT TRADE:

#### IMPROVED FACILITIES FOR FROZEN MEAT.

PARTICULARS of the scheme of the Port of London Authority for the provision of additional cool-storage facilities and for the improved handling of frozen meat at the Albert Docks have been received from the High Commissioner. The scheme—the confirmation of which has been announced by cable—is as follows:—

The conversion of Nos. 29, 31, and 33 sheds into two-story sorting-sheds, with a total length of 1,150 ft. and a breadth of 120 ft. The upper portion to be insulated and used for meat, and the lower portion for general cargo.

The erection of a cold-store at the rear, 300 ft. in length, 100 ft. in breadth, five stories in height, and having accommodation for 250,000 carcasses of sheep.

This scheme will enable frozen produce to be discharged by conveyors direct from the holds of ships into the sorting-sheds, and to be conveyed thence to barges, railway trucks or road-vans, and, if desired, to the cold-store. Such accommodation will much accelerate the discharge of vessels and ensure the delivery or housing of frozen produce with a minimum amount of handling and exposure. If these arrangements are appreciated by the trade and the business develops the scheme is capable of extension by the gradual erection of further sheds. The Victoria and Albert Docks are in direct rail communication with the provinces and are within the London cartage area, which admits of direct deliveries to Smithfield Market.

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#### COMBATING PREJUDICE IN GERMANY.

THE importation of frozen meat is not only opposed by the German Government, which favours the agrarian interests, but popular prejudices against the frozen product have also to be overcome. The practical manner in which this is being done may be seen by the following account of a demonstration, translated from a recent number of the *Gartenlaube*, a widely read German magazine:—

“Against frozen meat, the increased importation of which was demanded by the representatives of the people on account of the high prices of meat, serious objections had been advanced, chiefly from interested circles. Thus it was asserted to be inferior to fresh meat not only in taste and appearance, but especially also in nutritive value as well as in wholesomeness. How weak these objections are has been demonstrated by a recent demonstration at Berlin. On the 2nd June, 1911, under the supervision of a veterinary surgeon, a quarter of fresh beef had been hung up in a freezing-chamber of the Society for Market-halls and Cool-stores, Berlin, and had remained there at a temperature of 21°, under regular supervision by experts, until the 17th April of this year—i.e., full ten months and a half—without showing any alteration whatsoever in composition, colour, &c. Then it was first exposed for twelve hours to a temperature of 32°, then for another twelve hours to 41° in an air containing 85 per cent. of moisture, and finally it was hung up for a similar period in a room the temperature of which was maintained at 52° to 59°. It was then handed over to the chef, who worked it up into broth, fresh brisket of beef, beef *à la mode*, roast fillet, and beefsteaks, minced and tartar beefsteak. The committee, composed mainly of experts, was present at the demonstration. It was unanimously agreed that the meat was not only free from objection, but was perfectly equal to fresh meat as far as taste and appetizing appearance, smell, and nutritiousness were concerned.”



## POSITION IN FRANCE.

THE agrarian party in France continues to maintain a determined opposition to the proposal to admit frozen meat into France. A committee of the National Society of Agriculture of France, which has been investigating the problem recently, made the following report (translated from "La Vie Agricole et Rurale") :—

"France, with or without the aid of her colonies, has a sufficient supply of live-stock not only to meet her interior requirements but also to answer demands for exportation, especially if the expansion of the raising of live-stock is not hampered. The relatively high price of meat is a logical consequence of the social and economical evolution of the country, and a very considerable reduction of the prices ruling at present need not be counted upon. It is possible, however, to remedy to a certain extent the state of affairs under which we have suffered, and are still suffering, by a reform of the trade in live-stock and the administration of our slaughterhouses."

At the time this report was issued the values ruling for meat in Paris were as follow : Beef, 7d. to 9d. (per pound, wholesale) ; calf, 7d. to 11½d. ; mutton, 8d. to 11½d. ; pork, 9d. to 10d. Horses for the slaughterhouse, £2 16s. to £11 4s.

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PRESERVATIVES IN BUTTER: NOTIFICATION OF PROHIBITIONS.

THE attention of the Government has been drawn to the fact that on occasions recently shipments of Australian (and in one case New Zealand) butter to Honolulu have been refused admission by the authorities on the ground that the butter contained boric acid or other preservatives. It is therefore notified for general information that the Hawaiian Public Health Regulations prohibit the manufacture or sale of food containing any added substance or ingredient which is poisonous or injurious to health, or any deleterious substance not a necessary ingredient in manufacture, and in the case of milk and cream specifically prohibit the use of any preservative or antiseptic. The regulations seem to be strictly applied to butter containing boric acid, and the attention of shippers is drawn to the loss they may suffer by the use of this preservative in butter intended for the Hawaiian market.

It is also notified for general information that the introduction into the United States of butter containing preservatives of any kind is prohibited.

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INTRODUCTION OF HORSES INTO GREAT BRITAIN.

New regulations relating to the introduction of horses into Great Britain appeared in the *New Zealand Gazette* of the 8th instant. Attention is particularly directed to the fact that a veterinary surgeon's certificate must accompany each animal, and that, to facilitate the landing of the animal in Great Britain, it is desirable that a landing license should be applied for before the steamer by which the animal is conveyed is due to arrive. In this connection the veterinary officer attached to the High Commissioner's staff will be pleased to assist intending exporters from New Zealand.

## VANCOUVER MARKETS.

THE New Zealand Trade Representative at Vancouver reports as follows on the position of New Zealand produce on the Vancouver market :—

Vancouver, 11th June, 1912.

### NEW ZEALAND BUTTER.

The quality of the New Zealand butter has given extreme satisfaction to the public. It has also proved a boon to the merchants, seeing the boxes contain full weight, thus enabling the packers to turn out full-weight bricks of 16 oz.

The importers have great difficulty in persuading their customers to buy Californian or Canadian butter in lieu of New Zealand. For instance, when the merchants receive orders, the buyer usually and specially mentions New Zealand butter if possible, with no objection to price, so much so that many of the principal merchants declare they could easily sell a limited quantity all the year round, if procurable, even though they had to pay three or four cents a pound more than they could purchase Californian or Eastern Canada butters for.

Mr. Robertson, of the firm of Robertson, Morris, and Co., butter and produce merchants, is leaving by the s.s. "Makura" to arrange for their coming season's requirements of butter. Mr. Robertson at one time was connected with the dairy industry in Eastern Canada. His brother is Dr. James W. Robertson, formerly Agricultural and Dairy Commissioner for Canada, and now Chairman of the Royal Commission on Industrial Training and Technical Education for Canada.

The merchants of Victoria import direct a fair quantity of New Zealand butter. They are highly pleased with the quality, and are now making arrangements for the coming season's supplies. The population of Victoria is reported to be 40,000. It is the seat of the Government of British Columbia.

### APPLES.

Several small shipments of New Zealand apples have reached this market—principally Munro's Favourite, Cox's Orange Pippin, Cleopatra, Rokewood, London Pippin. The apples arrive in very fair condition, although the fruit was too small for this market. The size of fruit mostly in demand in Vancouver is the four-tier fruit, which contains about 100 to 120 apples in the Canadian standard apple-box, weighing about 40 lb. net. The smaller apples ranging from 130 to 200 apples in a box are not so favourably looked upon.

### HAMS AND BACON.

Prices are  $\frac{1}{2}$  cent higher than at this time last month. A large number of pigs are supposed to be in the country, but it is estimated that the demand for hams and bacon will be much heavier this year on account of the rapid increase of population, due to the heavy immigration from the United States and Europe.

### EGGS.

The same remarks apply to eggs. It looks as if the demand for eggs will be greater than the supply.

### Re TASMANIAN APPLES.

A large shipper of Tasmanian apples to the Old Country passed through Vancouver recently on his way to England, and took the opportunity of showing a few boxes of Tasmanian apples which he had brought over with him on the "Makura." The varieties included Scarlet Pippin, French Crab, Munro's Favourite, Cox's Orange Pippin, and New York Pippin. The apples arrived in excellent condition and were fine-flavoured fruit. Some of the apples were rather small, but several of the varieties—principally the Munro's, French Crabs, and New York Pippins—were the right size for the Vancouver market. We would not be surprised at the Tasmanian shippers making a bid for a share of the apple trade of the Pacific Coast. There is a rumour amongst local shipping men that the new steamship service will soon be operated between Melbourne and Vancouver. Such a line would provide facilities for Tasmanian shippers, doing away with the necessity of sending their fruit to Sydney for transhipment.

## WEST CANADIAN MARKETS.

## AUSTRALIAN SHIPMENTS.

FOLLOWING were the Australian shipments made by the subsidized New Zealand - Canadian Vancouver service since the 31st March :—

“Marama,” from Sydney, 8th April, 1912.—For Honolulu—576 quarters beef, 250 carcasses mutton, 45 carcasses lamb, 8 crates rabbits, 1 case tinned rabbits, 80 boxes butter, 2 cases tinned butter, 200 crates and 362 cases onions ; for Vancouver—50 quarters and 159 pieces beef, 618 carcasses and 72 sides veal, 3,750 carcasses and 1,250 pairs legs mutton, 650 crates rabbits, 320 cases meat, 5 cases frozen sundries, 3,000 sacks hides, 750 cases and 100 crates onions, 144 ingots tin ; for Victoria (B.C.)—50 crates veal, 400 carcasses and 350 pairs legs mutton, 4 cases kidneys, 50 crates rabbits, 144 cases poultry, 10 cases meat, 1,200 cases onions ; for Seattle—3,328 cases onions. Transshipments : 282 packages hides, 70 bales and 332 packages skins, 420 packages peas, 57 packages cucumbers.

“Makura,” from Sydney, 6th May, 1912.—For Honolulu—754 quarters beef, 45 carcasses lamb, 4 crates rabbits, 1,193 bags dried blood, 80 boxes butter, 162 cases onions, 35 cases tea, 17 cases jam, 1 sack seed, 1,956 sacks sulph. ammonia ; for Vancouver—100 quarters and 300 pieces beef, 169 bodies veal, 3,850 carcasses and 1,100 pairs legs mutton, 25 crates kidneys, 100 crates rabbits, 203 cases meat, 21 crates frozen sundries, 7,000 hides, 1 bale skins, 54 barrels oil, 45,459 ft. timber ; for Victoria (B.C.)—50 bodies veal, 400 carcasses and 451 pairs legs mutton, 1 case meat, 2 cases frozen sundries, 50 cases soap ; for Seattle—25,312 ft. timber ; for Bremerton—32,994 ft. timber. Transshipments : 73 bags livers, 128 bales skins, 603 bags hides, 374 bales wool.

“Zealandia,” from Sydney, 3rd June, 1912.—For Honolulu—248 quarters beef, 668 sacks dried blood, 15 cases butter, 4 sacks seed, 20 cases tea, 3 cylinders ammonia, 4 sacks seed ; for Vancouver—34 quarters beef, 174 carcasses and 200 sides veal, 498 carcasses and 800 pairs legs mutton, 331 cases meat, 12 cases frozen sundries, 75 crates rabbits, 1,354 sacks hides, 155 barrels oil, 7,525 ft. timber ; for Victoria (B.C.)—32 carcasses and 140 sides veal, 163 carcasses and 620 pairs legs, 330 cases meat, 25 crates rabbits, 2 cases frozen sundries. Transshipments : 226 bales wool, 24 cases brandy, 1,290 sacks hides, 115 cases jam.

“Marama,” from Sydney, 1st July, 1912.—620 quarters and 1 keg beef, 5 cases tinned rabbits, 314 sacks dried blood, 1,408 bags ammonia ; for Vancouver—16 quarters and 1 keg beef, 750 carcasses and 300 sides veal, 3,600 carcasses and 292 pairs legs, 858 cases meat, 100 crates rabbits, 17 crates kidneys, 6 cases frozen sundries, 78 barrels oil, 6,079 sacks hides, 1,251 pieces and 14,221 ft. timber, 1 sack seed ; for Victoria (B.C.)—100 carcasses and 83 sides veal, 600 carcasses and 365 pairs legs mutton, 25 crates rabbits, 5 crates kidneys, 50 cases wine. Transshipments : 214 bales and 90 bags skins, 274 bags skins and hides, 330 bales skins and wool, 183 bales wool and hides, 227 bales wool, 54 bales linen, 30 sacks and 10 bags potatoes, 6 cases fruit, 85 cases jam.

“Makura,” from Sydney, 29th July, 1912.—142 quarters beef, 520 carcasses and 294 sides veal, 267 carcasses and 520 pair legs mutton, 100 crates rabbits, 20 cases meats, 10 cases sundries, 29 cases meats and jams, 50 bales dry hides, 13 casks, 933 sacks, and 66 bales hides, 27 bales skins, 420 sacks dried blood, 129 cases jam, 4,105 pieces of timber, 63 hardwood girders. Transshipments : 24 bales wool, 2,409 packages hides, 940 packages skins, 57 bags linen, 61 cases jam.

# NEW ZEALAND - VANCOUVER SUBSIDIZED STEAM SERVICES.

FOLLOWING are the shipments of produce for Vancouver and North American Ports from New Zealand since March last :—

	"Marama," 12th April.	"Makura," 14th May.	"Zealandia," 10th June.	"Marama," 5th July.	"Makura," 2nd August	Totals.
Butter, boxes ..	3,300	1,510	80	1,600	3,987	10,477
Lamb, carcasses ..	10	..	..	..	..	10
Mutton, " ..	30	..	..	..	..	30
Veal, " ..	27	52	..	..	..	79
Beef, quarters ..	6	8	40	..	..	54
Beef, boned, bags ..	10	25	605	..	..	874
Frozen sundries, packages ..	11	7	8	4	6	36
Wool, bales ..	10	178	27	9	21	245
Pelts, casks ..	5	..	..	..	..	5
Grass - seeds, beans, &c., sacks ..	383	..	260	21	430	1,094
Hides and skins, sacks, &c. ..	217	419	344	861	425	2,226
Onions, cases ..	2,429	350	2	..	..	2,781
Sheep-skins, bales ..	..	45	35	..	20	100
Jam, cases ..	..	150	..	..	..	150
Sundries, packages ..	4	46	111	110	144	415
Potatoes, crates ..	..	..	17	..	..	17

# WEST AMERICAN AND ISLAND MARKETS.

## NEW ZEALAND - SAN FRANCISCO SUBSIDIZED STEAM SERVICES.

THE following are the shipments of produce for San Francisco, Rarar-tonga, and Tahiti from New Zealand since March last :—

	"Aorangi," 26th April.	"Tahiti," 24th May.	"Manuka," 21st June.	"Aorangi," 19th July.	Total.
Gum, packages ..	15	7	24	4	50
Seeds, sacks ..	37	88	340	..	465
Grain, &c. ..	86	73	46	60	265
Meats, cases ..	71	140	153	161	525
Onions, cases and sacks ..	5	1	2	5	30
Potatoes ..	27	48	37	30	142
Timber, bundles ..	..	500	..	..	500
Sundries, packages ..	69	73	92	380	614
Butter, boxes ..	802	2	2	3	809
Apples, cases ..	100	6	..	4	110

## ANSWERS TO CORRESPONDENTS.

## BUTTER.

"A Gordon," Hokianga, writes,—

Will you kindly inform me in your Answers to Correspondents,—

- (1.) Where to send butter to be graded, how much to send, and cost of getting it done.
- (2.) When milk or cream is too cold to be separated or churned, if the temperature should be raised by adding hot water or by standing the cans in a bath of hot water.
- (3.) How to tell when the water has been sufficiently worked off the butter.
- (4.) Which is the best mechanical means of working the water out, where procured, and price.
- (5.) Which is the best butter—whether that which is worked up with the hands, as in breadmaking, or that never handled until it is wrapped in paper, it being understood that in both instances every care has been taken as to cleanliness. Which should fetch the higher price?

The Director of the Dairy-produce Division replies,—

(1.) Only butter that is intended for export comes under the compulsory system of grading, and it must be forwarded to one of the following grading-stores: Auckland, New Plymouth, Paten, Wanganui, Wellington, Lyttelton, Dunedin, Bluff, Timaru. No charge is made for the grading of butter.

(2.) The temperature of milk or cream should never be raised by the addition of hot water. Either dry steam or hot water in a jacketed vessel should be used for this purpose, or the cream may be set in a tub of water the temperature of which is a few degrees above that at which it is desired to churn.

(3.) The working of butter should be discontinued when the salt has been thoroughly incorporated, and the butter worked into a solid mass until the particles of water are evenly distributed throughout the butter.

(4.) There are several good hand butter-workers on the market, which can be procured from any of the firms dealing in dairy supplies. The prices range from £1 15s. to £2 10s.

(5.) Butter should never be touched with the hands, but handled with wood butter-pats, duly scalded and soaked in cold water beforehand.

## BOOKS ON SHEEP.

MR. E. M. MASTERS, Rangitihi, Mongonui North, writes,—

I am sheep-farming, and anxious to get all information possible. Are there any colonial works on sheep? All I can get are either English or American (Youatt's and Randall's), and feel that our climate may somewhat alter the managements.

The Live-stock and Meat Division replies,—

We do not know of any colonial work on sheep-management. There may be one published in Australia, but here again the conditions, as in the case of Great Britain and America, are different from those of this country. We do not think it matters much where the book is published so far as management, &c., is concerned; it is in the matter of disease to which objection must be taken. Chapters on disease in most of the works on sheep which we have seen are absolutely no use here. The Department has from time to time issued leaflets and bulletins on most of the diseases met with in this country.

## THE FIELD-PEA.

MR. W. J. HOSKING, Inchiquin Farm, Fairlie, writes,—

I should like some advice through the columns of the *Agricultural Journal* as to the best method of growing field-peas for marketing. My farm is in the Mackenzie

Country, about seven miles from Fairlie, and forty-seven miles from Timaru. We are about 1,000 ft. above the sea-level, and have a good average rainfall. The part of the farm I was thinking of sowing in peas consists of good soil of good depth and has a shingly bottom. There is another part of the farm with clay bottom, and it also has good soil about 6 in. to 8 in. deep. This part of the farm is bad with twitch, and during the past season it has been impossible to clean it. Would peas be of any use to kill out the twitch-grass?

The land with the shingly bottom is clean of the twitch, and the yield this year was 52 bushels Garton oats sown without manure. The twitch part had wheat in, which followed a crop of rape. I have not threshed the wheat yet, but estimate the yield to be 25 to 30 bushels (40 acres).

I desire advice as to the best method of preparing the land, and the best sort of pea.

#### The Fields and Experimental Farms Division replies,—

The chief requirement of the field-pea is a clean, well-prepared, and firm seed-bed. This plant, in common with other legumes, prefers a soil on a limestone formation; it also produces good crops on other lands where lime has been previously applied. The field-pea responds to phosphatic fertilizers. There is no special cultivation for the pea. The land should be prepared as for the usual crop, but to ensure success the weeds must be controlled. The pea, under ordinary conditions, cannot be considered a cleaning crop; the haulms lie apart, and so allow weeds to assert themselves. On the other hand, if the crop is cleaned by hoeing, the pea would, to some extent, assist. This method is, however, not usual.

Twitch is not controlled by such a crop as peas. It must be realized that the twitch is already in the land. Its roots are established, it at once grows, it is in possession; the plant from seed cannot compete. Thorough cultivation, and a carefully cleaned root crop, are the only means of controlling this weed.

The varieties of peas that are usually availed of are the Partridge and the Blue pea.

#### BARLEY.

MR. F. STEWART, Waipipi, Waiuku, writes,—

I intend to put in about 10 acres of barley this season. What would you recommend to be used as manure, and also what kind of barley would you advise sowing?

The land is heavy puriri bush land of a sandy nature. Would you advise rolling after the seed is drilled?

#### The Fields and Experimental Farms Division replies,—

It cannot be recommended to grow barley in the Waiuku district, except for feeding-off. Cape or Russian barley is most in favour for this purpose. A firm seed-bed is required; rolling would be necessary.

#### The Agricultural Chemist replies,—

For barley I would recommend 1 cwt. super. mixed with 1 cwt. bonedust.

#### RABBIT-DESTRUCTION.

J. E. H., King-country, writes,—

Will you please answer the following question in the next number of the *Journal*: With reference to rabbit-fumigation, dealt with in the June number, how is the fumigation process carried out? What quantity of carbon-bisulphide is used to a burrow, and is any patent apparatus necessary to squirt the stuff in, or can it be poured in or done with a syringe? I should be obliged if you would give full details.

#### The Fields and Experimental Farms Division replies,—

Fumigation by carbon-bisulphide can be done in several ways. The proper process is by patent fumigator, of which there are two on the market, the Hunter-



Weston, and the Suddeth. If J. E. H. could communicate with Inspector McPhee, Te Awamutu, he could arrange to show him the whole process with the machine. The Inspector will be instructed from this office to do so.

The other process is by saturating a piece of old bag in the liquid and putting it some distance into the rabbit-burrow, and closing up the mouth and any other vent. The fumes then suffocate the rabbits. Or, when the saturated rag is placed in the burrow, throw in a lighted match: explosion of the fumes takes place, and this also has a deadly effect. But this system is not advised—it is dangerous and wasteful.

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#### SEED.—BREAKING UP THE SUBSOIL.

MR. V. G. ROCKELL, Maruia, Reefton, writes,—

Would you please let me know through the *Journal* the circumstances or conditions under which the Department of Agriculture distributes seeds to farmers?

I hear a lot about breaking up the subsoil of land. I have small patches of ploughable land on what has evidently been an old river-bed. There is up to 18 in. of good soil on top of clean gravel, and the water is not more than 3 ft. down anywhere. The soil is a blue silt, or, rather, half silt and half clay, and it is very stiff and dense, almost watertight, though it never gets hard. The top layer of gravel consists mostly of big stones; where these are mixed with soil it is necessary to make use of a pick or crowbar to shift them, while the gravel below is quite loose. Would it pay me to break up the hard layer between good soil and loose gravel?

The Fields and Experimental Farms Division replies,—

The Department does not distribute seed except in special circumstances. These are where it is desired to test a special variety or to test the suitability of the district for certain crops. In no case does it supply seed on a commercial scale.

It may be accepted that it is generally desirable to break up a close subsoil, particularly where it has the effect of preventing the drainage of water from the upper soil. It is not very clear from the inquiry whether the land is wet, so that it is difficult to state definitely whether the operation would be of great value. It is, of course, a useful farm practice to cultivate deeply under most conditions, especially where the subsoil presents no difficulties of drainage.

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#### FOOD FOR PIGS.

“BERKSHIRE,” Opotiki, writes,—

Can you advise me of a suitable bulky crop that would be available for feeding growing pigs, say from February to April? Up to that time the milk is sufficient, but while I might supplement it with crushed maize I would prefer growing a crop and would require a yield from a small area, enough to feed, say, forty. I shall appreciate any information on the subject.

The Fields and Experimental Farms Division replies,—

At the Weraroa Experimental Farm it has been found that one of the most satisfactory foods for pigs is the pumpkin (Ironbark variety recommended). Quite a small patch of well-cultivated pumpkins will supply food for a large number of pigs. Peas (both haulm and pod) are a satisfactory addition to the pumpkins. It would also be useful to provide turnips, and potatoes that are not suitable for table or seed purposes.

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#### CONTAGIOUS ABORTION.

MR. E. W. TOOGOOD, Aratapu, writes,—

I should like to know through your correspondence page if contagious abortion in cows can be transmitted to other animals, such as horses or sheep. Also, if a cow aborts

when well gone in calf and the calf cannot be found, which may easily happen in a rough paddock, what length of time should cows be kept out of that paddock?

The Live-stock and Meat Division replies,—

We have no evidence that contagious abortion of cattle can under ordinary circumstances be transmitted to horses or sheep. Of course, if the micro-organism is isolated, and a culture of it inoculated into a pregnant animal of these species it might cause abortion; but I do not think there is any risk through them running together in the same paddock. Several instances have occurred in the case of mares where it is highly probable that a contagious form of abortion existed, but they were not in New Zealand.

Regarding your query about the cow aborting and the foetus cannot be found: In this case I should take the cow away from the others. As a rule there is not much difficulty in finding the foetus if of any size. The other cattle or dogs soon draw attention to it; and when it cannot be found it is generally due to the owner not exercising necessary observation over his herd. If a man can tell when a cow has aborted he ought to be able to find the foetus.

We have no idea how long the organism causing the condition can live in pastures. Instances seem to prove that this can be some months. It must be borne in mind also that the vaginal discharge from the cow contains the organism. This is the reason why I advise removing the cow to some small paddock instead of moving the other cattle.

#### MANURES.—MOLASSES.

MR. E. F. PEACOCKE, Hamilton, writes,—

(1.) Could you tell me whether bone char, a by-product of sugar-refining, is in a fit condition for application to the soil as a manure, and how it compares with Malden Island guano as a phosphatic manure?

(2.) What is the advantage, if any, of basic superphosphate over ordinary superphosphate, and would it be advisable to use it as a top-dressing in conjunction with kainit on sandy soil?

(3.) Does the addition of molasses with hay or chaff, when fed to dairy cows, materially increase the milk-yield, and, if so, what quantity per cow should be fed per day?

The Agricultural Chemist replies,—

(1.) It is impossible to compare the values of different manures without knowing the composition of them. In the case you mention each fertilizer contains only one manurial ingredient, which is the same in both. Hence it is only a matter of ascertaining the proportion of phosphoric acid which each contains, and comparing these figures with the prices. (For the method employed see Annual Report, 1908, p. 233.)

(2.) Basic superphosphate is superphosphate to which lime has been added. This makes the superphosphate insoluble in water and corrects excessive acidity. Basic superphosphate may therefore be used on a sour soil, and it is quite likely to give good results on sandy soils, as a top-dressing.

The Director of the Fields and Experimental Farms Division replies,—

(3.) The addition of molasses to the ration of dairy cattle very materially increases the quantity of milk. The profit attending its use can only be decided by the farmer himself, as the cost of the molasses, and of the material with which it is mixed, as well as the cost of labour in relation to the value of the increased milk-production, require to be considered. It is usually accepted that molasses are most conveniently supplied to stock mixed with coarsely-cut chaff. The molasses are diluted with water sufficient to permit it to be easily poured from a suitable vessel, as a can or bucket (the mixture would be about the consistency of quite thin cream). This can then be sprinkled over a heap of chaff. This heap can then be turned and mixed with a long-handled shovel. The chaff should be thoroughly moistened, but without an excess; there should be no liquid to soak out. If small quantities of chaff are used, the mixing is conveniently performed in a trough or shallow tub. If molasses are fed with hay, a greater quantity of water will be required. It is usually sprinkled over the hay as it is being filled into the feeding-racks through the rose of a watering-can. It is found that the use of molasses in moderate quantities is beneficial to all

domestic animals. This is, firstly, on account of its being a food, and secondly because it is in the nature of a condiment which induces animals to consume dry foods, as straw or chaff, in larger quantity than would be the case without this addition. Animals must be gradually accustomed to its use, or the laxative effect (actually purging) will be found to be detrimental. An increased urination would also be observed. The amount of molasses supplied to a cow of medium size should at first not exceed 1 lb.; later, this may be increased to 3 lb. The effect on the cow should be carefully observed, and the quantity reduced, or altogether withdrawn, if there be purging. It may be observed that it is seldom that farmers continue the use of molasses for any length of time, for, apart from cost, this food is tiresome to handle. The general opinion is that molasses are not worth their cost and trouble, and as one who has had experience of it, its use is not highly appreciated, nor can it be particularly advocated.

#### MANGEL.—CHOU MOELLIER.

MR. M. GIBENS, Darwinian Farm, Karamea, writes,—

What sort of mangel is the best cropper, and what kind of artificial manure do you recommend for same?

Where can I obtain chou moellier seed, and what is the price of same post-free?

The Fields and Experimental Farms Division replies,—

It would be misleading to describe any variety of mangel as the best. Those in repute are the Long Red, the Globe, and the Tankard. It is usually accepted that the Long Red yields the greatest weight, and for general purposes it is probably the most useful. It is recommended that one variety should be chosen for the main crop, and that small plots of other varieties should be sown as tests for suitability. This root is readily influenced by conditions of soil, cultivation, and climate.

Chou moellier seed can be purchased from the principal seedsmen. It is quoted at 5s. per pound.

The Agricultural Chemist replies,—

Use  $1\frac{1}{2}$  cwt. superphosphate, 2 cwt. island guano, and  $\frac{1}{2}$  cwt. sulphate of potash per acre.

#### COW-TESTING.

MR. F. G. SEYMOUR, Tututawa, writes,—

Would you kindly advise me through the *Journal* if taking seven days' samples of milk and testing on the eighth day every month of the season, and weighing through the whole period, would be sufficient to find out what the cows are worth? Or should it be done oftener?

The Director of the Dairy-produce Division replies,—

If the milk given by each cow in the herd is weighed daily throughout the whole period of lactation and samples are taken night and morning for two consecutive days once a month, tested for butter-fat, and the total production worked out on that basis, the returns would be quite accurate. This system has been compared with that of taking samples for testing for a longer period, and it was found that daily weighing and sampling for two days once a month proved equally dependable. Fairly accurate results can be obtained by reducing the weighing of the milk to two days in each month, and taking samples for the same period to ascertain the butter-fat content. But where farmers can see their way to adopt the weighing of milk daily from each cow, it is much to be preferred.

#### FIELD-CROPS AND MANURES.

MR. W. J. PARSONS, Wellington, writes,—

I have purchased a farm at Renwicktown in Marlborough. It is an agricultural (not grazing) farm, and if the Department has had any experimental plots conducted

in the locality I would be very pleased if you would give me the address of the farmers and any other information.

I intend planting 50 acres of peas. Please recommend a manure or a mixture of manures suitable for the district for peas, potatoes, beans, oats, wheat, barley, and fruit-trees. Have Lima or Soya beans been tried in the district under the Department's directions? If not, I would very much like to try them if your Department is conducting any experiments this year.

Do beans take much more than peas out of the soil? I have been advised not to grow them on that account. What is your opinion?

The Fields and Experimental Farms Division replies,—

The Department has no field-plot experiments on farms in Marlborough. A series of tests was carried out on small plots at the Blenheim High School.

Last season the Department distributed seed of the Soya bean for testing purposes, and proposes to do so again this year. Lima beans are already well known in the garden.

The Agricultural Chemist replies,—

For peas I would advise  $1\frac{1}{2}$  cwt. superphosphate; 1 cwt. seed gypsum; and  $\frac{1}{2}$  cwt. guano, per acre. For beans, add  $\frac{1}{4}$  cwt. sulphate of potash to this formula.

For potatoes:  $4\frac{1}{2}$  cwt. superphosphate,  $\frac{3}{4}$  cwt. sulphate of ammonia, and 1 cwt. muriate of potash, per acre.

For fruit-trees apply a mixture of 2 lb. bonedust and superphosphate (equal parts), 1 lb. seed gypsum, and  $\frac{1}{2}$  lb. sulphate of potash, to each fair-sized tree, forking the mixture well in round the roots.

For oats, wheat, and barley: 1 cwt. superphosphate, and 1 cwt. bonedust, per acre.

Beans take more potash from the soil than peas.

#### AMERICAN SEED-MERCHANTS.

F. H. S., Manakau, Manawatu, writes,—

I would be glad if you could give me the address of say, two American seed-merchants, as I am desirous of sending for some seeds.

The Fields and Experimental Farms Division replies,—

Atlee, Burpee, and Co., Philadelphia; Conard, Jones, and Co., Westgrove, Pennsylvania; Dingee and Conard, Pennsylvania; Fancher Creek Nurseries, Fresno, California; Oregon Nursery Company, Oregon; Roscoe, Fuller, and Co., New York; A. L. Wood, Rochester, New York.

#### PHOSPHORIC ACID AND PHOSPHORIC ANHYDRIDE.

MR. J. R. BRODIE, Rangitata Island, writes,—

I have read with interest the article in the June *Journal* on basic slag, and with reference to the beginning of your remarks on how to buy slag (page 459), I am led to understand that phosphoric acid and phosphoric anhydride are of equal value—that is, two names for one and the same article; but a note at the foot of page 460 seems to show that the former is little more than half the value of the other. Kindly reply.

The Agricultural Chemist replies,—

In the trade, and when speaking in a non-scientific manner, phosphoric anhydride is often referred to as "phosphoric acid." 196 parts of phosphoric acid are equivalent to 142 parts of phosphoric anhydride, which is, of course, nothing like the proportion of 2 to 1 suggested by the correspondent. The proportion of tri-calcic phosphate to phosphoric anhydride is, however, a little more than 2 to 1 (viz., 2:183 to 1). As the Fertilizers Act, 1908, stipulates that the invoice certificate

of any fertilizer sold shall state the amount of phosphoric anhydride and its equivalent in tricalcic phosphate contained in the fertilizer, little confusion should arise.

#### CHOU MOELLIER.

MR. T. E. MAUNSELL, Carterton, writes,—

Could you kindly give me information through your columns in regard to chou moellier? Where is the seed procurable? How and where should it be sown, and what manure should be employed? At what stage should it be given to stock?

The Fields and Experimental Farms Division replies,—

Can be obtained from the leading Wellington seedsmen. Prepare a well-manured seed-bed, and sow the seed thinly in drills 12 in. apart. Keep soil well stirred between drills when plants are up, to invigorate growth. When about 8 in. high plant out in rows 2 ft. apart, and leave 3 ft. between each plant in the rows. The plants should be dibbled in when ground is wet or when there is likely to be rain. Keep ground well stirred while plant is growing, and as it increases in size it should be moulded up. Leaves should be cut off, and not pulled, when well grown and required. The plant is a heavy feeder, and should be well manured with stable manure if possible, or blood and bone.

The Agricultural Chemist replies,—

For manure:  $1\frac{1}{2}$  cwt. superphosphate and 1 cwt. bonedust.

#### MILK FROM ABORTED COWS.

MR. W. J. ROSS, Manakau, writes,—

I would like to know if the milk from an aborted cow may be regarded as fit for consumption. I am following out the instructions given in your issue of the 15th April.

The Live-stock and Meat Division replies,—

There is no reason why milk from a cow that has aborted should not be fit for consumption, provided always that the animal is in good health otherwise, the placental membranes having been expelled; and that the milk is not sold within four clear days after parturition, as provided for in section 15 of the Dairy Industry Act.

#### SPRAYING POTATOES.—APPLE TREES.

W. H., Templeton, Canterbury, writes,—

I would like to be informed through your *Journal* in regard to the following:—

I am planting 2 acres of potatoes, and as most of them round here were blighted I would like to know what to spray them with and how to mix it; and at what period to spray them.

I am also going to plant about thirty apple-trees in the spring. What kind would you recommend?

The Orchards, Gardens, and Apiaries Division replies,—

For potato-blight spray with the Bordeaux mixture, prepared as follows: Proportions—4 lb. sulphate of copper, 4 lb. fresh roche lime, 40 gallons water. Preparation—Dissolve the 4 lb. sulphate of copper in 20 gallons of water, slake the 4 lb. lime slowly, and make up to 20 gallons; strain this milk of lime into the solution of sulphate of copper, stirring briskly. Sulphate of copper may be dissolved by tying a piece of sacking and suspending overnight just below the surface of the water, or by using hot water. Vessels of wood or earthenware should be used. Commence spraying as soon as the crop is well above the ground, taking care to coat the stems and undersides of the leaves with the mixture, and continue

the treatment at intervals of about a fortnight. If the season is a dry one the blight will be less troublesome and fewer sprayings will be required.

The following varieties of apples are suggested as suitable: Beauty of Bath, Gravenstein, Golden Pippin, Jonathan, Delicious, Sturmer Pippin.

### BLACK WATTLE.

MR. E. V. FREED, Clyde, writes,—

Regarding black wattle for shelter-belt and a timber-tree, would it suit Central Otago and stand the hard frosts, and would the young seedlings do if transplanted?

The Orchards, Gardens, and Apiaries Division replies,—

It is very doubtful whether the black wattle would stand the severe frosts of Central Otago. However, a test could be carried out at a trifling cost, as the seed is inexpensive. It is possible, but not desirable, to transplant the young seedlings. If transplanted they should be removed from the nursery rows with a ball of earth round the roots, and replanted as soon as possible.

### SPRAYING APPLE-TREES.

“R.,” Karori, writes,—

By separate post I am forwarding you a cutting from a Sturmer Pippin apple-tree, and shall be pleased if you will be good enough to inform me what blight the tree is suffering from, and also a remedy, if possible, for its eradication.

I have three apple-trees in my garden, the one above mentioned, a Warren's King, which is also similarly attacked but to a lesser extent, and a Jonathan, the latter being perfectly free from blight of any kind. These trees have all been dressed regularly with Swift's arsenate of lead and red-oil emulsion, both with brush and spray, and are only young trees, being from four to five years old.

The Orchards, Gardens, and Apiaries Division replies,—

The Sturmer Pippin apple-tree has been attacked by woolly aphis. The most satisfactory remedy for this pest is to spray the trees when quite dormant in the winter with the red-oil emulsion diluted to winter strength, and later in the season to paint any colonies of the pest that may appear with the red-oil emulsion undiluted.

Red-oil emulsion prepared with soap: Proportions—1 lb. soft-soap, 1 gallon red oil,  $\frac{1}{2}$  gallon of boiling water. Preparation—To make the emulsion, put the soap into a tub and pour the boiling water over it. Stir briskly to a good lather, and add the oil. Now make use of your spray-pump, put both delivery and suction ends of spray-pump hose into the tub, and work the pump steadily for a few minutes: this will cause a perfect emulsion.

### SHIFTING OF HIVES.

MR. CHAS. W. ZIELE, Christchurch, writes as follows,—

Would you advise me re shifting hives of bees from one portion of my garden to another—about 2 chains away. Can I shift them now without risk of the bees going back looking for their hive from where it was shifted?

The Orchards, Gardens, and Apiaries Division replies,—

Now is the proper time to move bees. They may be shifted the whole distance during wet weather with safety. If the weather is fine, keep them confined to their hive in the new position for a couple of days by tacking a piece of perforated zinc over the entrance. In the summer-time bees may be moved short distances by shifting a few feet each night.



## SHIPMENTS OF PRIMARY PRODUCE FROM NEW ZEALAND TO UNITED KINGDOM.

COMPILED FROM MANIFESTS OF VESSELS SAILED DURING RESPECTIVE MONTHS OF THE CURRENT AND PRECEDING SEASONS.

Month.	Mutton, Carcases.	Lamb, Carcases.	Beef, Quarters.	Butter, Boxes.	Cheese, Crates.	Wool, Bales.	Wheat, Sacks.	Oats, Sacks.	Rabbits, Crates.	Hemp, Bales.	Tow, Bales.	Kanri- gum, Cases.	Sundry.
January, 1911	237, 284 175, 337	302, 399 287, 120	12, 424 13, 568	114, 512 90, 405	64, 005 46, 375	95, 994 127, 199	.. ..	.. 16	7, 295 399	6, 865 15, 234	1, 942 3, 302	3, 407 7, 094	59 carcases pork. 590
February, 1911	208, 424 242, 090	273, 246 450, 406	13, 052 24, 924	101, 544 86, 968	62, 398 46, 667	106, 074 70, 030	607 23, 694	.. 200	.. ..	6, 831 4, 428	1, 615 1, 302	1, 050 2, 113	.. 1, 969 carcases pork.
March, 1911	324, 192 264, 297	518, 402 665, 822	20, 201 26, 637	64, 925 45, 912	49, 308 40, 668	70, 022 58, 362	.. 40, 276	4, 980 ..	.. ..	3, 832 3, 650	1, 352 1, 583	2, 644 8, 982	16 carcases pork. 2, 408
April, 1911	213, 178 172, 563	355, 823 491, 413	7, 046 19, 106	38, 986 14, 823	38, 137 33, 411	31, 615 42, 317	4, 905 38, 456	2, 180 6	.. ..	5, 134 9, 233	1, 958 1, 327	4, 458 2, 577	.. 2, 431 carcases pork.
May, 1911	154, 506 204, 390	741, 257 377, 105	32, 601 20, 173	1, 441 995	40, 535 20, 732	51, 833 33, 033	11, 157 93, 854	26, 569 ..	1, 500 ..	11, 963 7, 443	2, 826 1, 210	6, 287 7, 720	.. 1, 087 carcases pork.
June, 1911	170, 738 214, 079	287, 637 448, 432	24, 605 15, 789	558 ..	7, 712 6, 323	18, 138 19, 568	9, 160 39, 422	7, 622 ..	2, 039 14, 128	5, 646 4, 763	1, 168 325	1, 213 5, 528	231 carcases pork. 2, 434
July, 1911	201, 097 206, 869	371, 474 260, 761	29, 457 14, 296	684 ..	1, 255 276	16, 567 14, 100	44, 324 29, 452	23, 213 ..	20, 573 10, 394	7, 463 6, 022	1, 850 1, 073	5, 892 2, 766	210 carcases pork. 175
August, 1911	66, 008 94, 468	110, 054 97, 839	9, 653 16, 440	.. 634	.. ..	5, 260 5, 381	31, 976 33, 970	.. 273	18, 231 22, 629	3, 443 1, 378	303 720	3, 475 6, 793	203 carcases pork. 362
September, 1911	102, 081 104, 925	40, 057 26, 416	6, 059 8, 420	6, 404 22, 644	.. 41	7, 890 6, 539	33, 151 40, 876	.. 3, 863	33, 059 7, 721	5, 604 2, 680	393 597	7, 672 1, 682	220 carcases pork. 255
October, 1911	9, 417 49, 010	2, 043 800	100 10, 531	49, 626 60, 014	11, 501 9, 159	2, 182 3, 189	.. 94, 815	.. 23, 330	32, 004 36, 947	4, 514 3, 632	754 1, 232	2, 982 3, 089	.. 56 carcases pork.
November, 1911	47, 770 62, 926	10, 427 29, 877	403 5, 554	135, 741 105, 759	57, 319 27, 749	44, 094 55, 551	15, 833 76, 594	.. 331	16, 606 23, 646	7, 844 6, 850	2, 183 2, 300	3, 085 4, 339	.. 911 carcases pork.
December, 1911	72, 192 82, 405	91, 965 137, 172	765 13, 155	109, 397 182, 051	46, 883 67, 162	54, 297 59, 080	.. ..	.. ..	4, 366 9, 716	5, 719 4, 594	1, 364 109	2, 708 5, 363	.. 686 carcases pork.

## HEMP AND TOW GRADING RETURNS.

JULY, 1912.

*Hemp*.—The total number of bales graded was 4,621, as compared with 4,005 bales for the corresponding month of last year, an increase of 616 bales. For the twelve months ending 31st July, 1912, the number of bales graded was 91,972 as compared with 96,035 for the previous twelve months, the decrease being 4,063 bales.

*Tow*.—During the month 1,549 bales were dealt with, as compared with 1,252 for the corresponding month of last year, an increase of 297 bales. For the twelve months ending 31st July, 1912, the number of bales graded was 25,377, as against 29,620 for the previous twelve months, the decrease being 4,243 bales.

## HEMP AND TOW GRADED THROUGHOUT THE DOMINION DURING THE MONTH OF JULY, 1912.

*Hemp.*

Port.	Superior.	Fine.	Good-fair.	Fair.	Common.	Rejected.	Condemned.	Total.
	Bales.	Bales.	Bales.	Bales.	Bales.	Bales.	Bales.	Bales.
Auckland ..	..	..	129	409	63	..	..	601
Napier ..	..	..	156	..	..	..	..	156
Foxton ..	..	..	339	790	6	..	..	1,135
Wellington ..	..	..	1,250	774	44	..	..	2,068
Blenheim ..	..	..	..	..	..	..	..	..
Picton ..	..	..	38	10	..	..	..	48
Lyttelton ..	..	..	..	15	58	..	..	73
Dunedin ..	..	210	16	1	..	..	..	227
Bluff ..	..	..	41	272	..	..	..	313
Totals ..	..	210	1,969	2,271	171	..	..	4,621
Percentages of totals	..	4.55	42.61	49.14	3.70	..	..	100

*Tow.*

Port.	First Grade.	Second Grade.	Third Grade.	Condemned.	Total.
	Bales.	Bales.	Bales.	Bales.	Bales.
Auckland ..	..	99	271	51	421
Napier ..	..	60	..	..	60
Foxton ..	71	258	25	..	354
Wellington ..	272	287	53	14	626
Blenheim ..	..	..	..	..	..
Picton ..	16	..	18	..	34
Lyttelton ..	..	..	..	..	..
Dunedin ..	..	10	..	..	10
Bluff ..	..	26	18	..	44
Totals ..	359	740	385	65	1,549

*Stripper-slips*.—Foxton, passed for shipment 19: total 19. Wellington, passed for shipment 111, condemned 9: total 120.

## STOCK EXPORTED.

JULY, 1912.

THE following table shows the numbers and descriptions of stock exported from the Dominion:—

Port of Shipment.	Horses.			Cattle.			Sheep.			Swine.
	To Australia.	To Pacific Islands.	To India.	To Pacific Islands.	To Java.	To Australia.	To Australia.	To South America.	To Pacific Islands.	To Pacific Islands.
Auckland .. ..	23	26	..	39	29	..	..	..	611	110
Gisborne .. ..	..	..	..	..	..	..	..	..	..	..
Napier .. ..	..	..	..	..	..	..	..	..	..	..
Wellington .. ..	64	..	..	..	..	..	..	..	..	..
Lyttelton .. ..	46	..	..	..	..	..	..	..	..	..
Timaru .. ..	..	..	..	..	..	..	..	..	..	..
Dunedin .. ..	13	..	..	..	..	..	..	16	..	..
Bluff .. ..	41	..	..	..	..	..	256	..	..	..
Totals .. ..	187	26	..	39	29	..	256	16	611	110

Following are particulars of the horses shipped: 151 draughts (43 stallions, 85 mares, 14 geldings, 5 colts, 4 fillies), 2 medium draught mares, 9 thoroughbreds (3 stallions, 5 mares, 1 gelding), 29 light horses (1 stallion, 27 mares, 1 gelding), 17 hackneys (15 mares, 2 geldings), 4 trotting-horses (2 stallions, 2 mares), 1 pony gelding.

## STOCK IN QUARANTINE.

THE following stock was received into quarantine during the month of July:—

No.	Breed.	Sex.	Port of Origin.	Owner or Agent.	Address.
MOTUIHI ISLAND (AUCKLAND).					
12	Holstein ..	Heifers ..	Vancouver	C. O. Buck'ard ..	Cambridge.
2	" ..	Bulls ..	"	" ..	"
4	" ..	" ..	"	H. S. Logan ..	Auckland.
1	King Charles ..	Male ..	San Fran-	Miss Beere ..	"
	spaniel		cisco		

## ARGENTINE TRADE WITH BRITAIN.

The Department has received the following cablegram from Buenos Aires, dated 6th August, 1912:—

The following shipments of produce were despatched from the Argentine to the United Kingdom ports during July, 1912 (compared with July, 1911):—

	1912.	1911.
Frozen beef (quarters) .. .. .	192,000	141,000
Chilled beef (quarters) .. .. .	220,000	215,000
Frozen mutton (carcases) .. .. .	228,000	216,000
Frozen lamb (carcases) .. .. .	59,000	89,000
Butter (cwt.) .. .. .	..	..

## PRODUCE IMPORTED.

THE following return, compiled by the Customs Department, shows the total importations into New Zealand during the month of July, 1912, of agricultural and farm products:—

Item.	Quantity.	Value.
Bran .. .. .	tons	£
Butter* .. .. .	8 cwt.	47
Cheese .. .. .	2 cwt.	9
Chaff .. .. .	ton	..
Fruits, fresh, all kinds .. .. .	1,492,703 lb.	11,607
Barley .. .. .	centals	..
Oats .. .. .	centals	..
Wheat .. .. .	centals	..
Onions .. .. .	64 cwt.	44
Pollard and sharps .. .. .	tons	..
Potatoes .. .. .	1 ton	11
Seeds, grass and clover .. .. .	162 cwt.	429
Total values imported .. .. .	..	£12,147

\* Returned New Zealand produce.

## STOCK IMPORTED: A COMPARISON.

THE following figures show the numbers of pedigree animals imported to the Dominion during the past two years, ending 31st March:—

	1910-11.	1911-12.
Bulls .. .. .	40	51
Cows and heifers .. .. .	97	112
Rams .. .. .	44	38
Ewes .. .. .	74	67
Swine .. .. .	40	..

## THE BRITISH PRODUCE-MARKET.

## HIGH COMMISSIONER'S CABLED REPORTS.

THE Department of Agriculture, Industries, and Commerce has received the following cablegrams from the High Commissioner for New Zealand. (NOTE.—Quotations, unless otherwise specified, are average market prices on spot.)

London, 13th July, 1912.

*Mutton*.—The market is steady, with a very good demand. Canterbury 3½d. to 4¾d. per lb., North Island 3½d. to 4½d., according to weight; ewes 3½d. per lb.

*Lamb*.—There is a good demand for all lamb. The deliveries are light at the market on account of the strike, but discharge is improving. Quotations show a weaker tendency. Canterbury heavyweights 5½d. per lb., light weights 6¼d. (scarce); other than Canterbury ½d. and ¼d. per lb. less than these.

*Beef*.—The market is quiet but firm. New Zealand hinds 4½d. per lb., New Zealand fores 3½d.

*Butter*.—The market is quiet but rather steadier. Stocks of New Zealand are pretty well cleared. Choicest New Zealand butter 113s. per cwt., Australian 106s., Siberian 103s., Danish 122s.

*Cheese*.—The market is declining on account of the heavy Home supplies. Business is dull. New Zealand white 66s. per cwt., coloured 67s.

*Hemp*.—The market is firm with improved demand. Spot: New Zealand good-fair grade £22 10s. per ton, New Zealand fair grade £21 5s. Forward shipment: New Zealand good-fair £22 10s. per ton, New Zealand fair grade £21 10s. Stock, 268 tons. The market for Manila is active at the advance. Spot: fair current manila £23 per ton. Forward shipment, £23 10s. The output from Manila for the week was 24,000 bales.

*Cocksfoot*.—The market is very quiet. No attention has been given to New Zealand prices, 64s. to 70s. per cwt. Buyers will not buy until results of Continental and American crops are known.

*Wool*.—The market remains firm.

London, 20th July, 1912.

*General*.—The strike continues; deliveries are very much delayed.

*Mutton*.—The market is quiet, and there is less demand. Prices have slightly declined for all grades. Canterbury 4½d. per lb., North Island 3¾d.

*Lamb*.—The market is quiet. Stocks on hand are heavy. Canterbury 5½d. per lb. other than Canterbury 5¾d.

*Beef*.—The market is depressed. The weather lately has been unfavourable to the sale of beef. New Zealand hinds 4½d. per lb., fores 3¾d.

*Butter*.—The market is steady. There is a good demand for best quality. Choicest New Zealand 115s. per cwt., Australian 106s., Siberian 104s., Danish 122s.

*Cheese*.—The market is dull. New Zealand white 65s. 6d. to 66s. 6d. per cwt.

*Hemp*.—The market is firm, with more inquiry, and active at the advance. Spot: New Zealand good-fair grade £24 15s. per ton, fair grade £23 15s., fair current Manila £24. Forward shipment about the same price. The output from Manila for the week was 24,000 bales.

*Kauri-gum*.—The market is steady with a moderate demand. Dark-brown selected rescraped £6 to £8, dark-brown three-quarter scraped £4 to £4 10s., dark-brown chips drossy £1 10s. to £2, rescraped pale amber £10 to £12, three-quarter pale scraped £7 to £8, diggers' chips good £2 5s. to £2 10s. 229 cases offered, 213 sold. Stock, 383 tons.

*Wool*.—Market remains firm.



*Mutton and Lamb.*—River Plate shipments received during June, 1912:—

	Mutton Carcases.	Lamb Carcases.
London .. .. .	102,132	61,597
Liverpool .. .. .	104,237	84,084
Hull .. .. .	11,535	1,818
Southampton .. .. .	16,237	13,198
	<hr/> 234,141	<hr/> 160,697
June, 1911 .. .. .	292,968	115,807

London, 27th July, 1912.

*General.*—The strike is unsettled, and deliveries are still restricted.

*Mutton.*—The market is quiet but rather steadier. No change in price—viz., North Island 3½d. per lb., Canterbury 4½d.

*Lamb.*—The market is slightly weaker, with less demand. Holders are anxious to sell, and supplies are increasing. Canterbury 5½d. to 6½d. per lb. (according to quality), other than Canterbury 5¼d. to 5½d.

*Beef.*—The market is weak and inactive. Supplies of River Plate are heavy. New Zealand hinds 4d. per lb., fores 3½d.

*Butter.*—The market is firm. There is a better demand. New Zealand is firmly held in second hands. Choicest New Zealand is 116s. per cwt., Australian 108s., Siberian 106s., Danish 125s.

*Cheese.*—The market is rather more active. New Zealand white 65s. 6d. per cwt., coloured 66s. 6d.

*Hemp.*—The market is very firm. A scarcity of best quality. Spot: New Zealand good-fair grade £26 per ton, fair grade £24, fair current Manila £24. Forward shipment: July to September, at the same prices. The output from Manila for the week was 44,000 bales.

*Wheat.*—The market is dull, very little business doing.

*Oats.*—The market is quiet, prices slightly weaker.

*Peas.*—The market is steady, but demand only moderate.

*Beans.*—The market is irregular and without business. New Zealand grain is not at present in store.

*Cocksfoot-seed.*—The market is quiet. Buyers are not keen to do business in cocksfoot-seed.

*Wool.*—The market is firm. A good demand for all descriptions.

London, 30th July, 1912.

*Eggs.*—The market is firm. A good demand for all descriptions. Per 120: Home 10s. to 11s. 6d., Italian 9s. 3d. to 10s. 3d., French 10s. to 12s. 6d., Austrian 8s. 3d. to 9s., Russian 7s. to 8s. 6d., Dutch 9s. 3d. to 12s., Danish 9s. 3d. to 10s. 9d.

*Poultry.*—The market is firm owing to reduced supplies. Chickens: Home 11d. to 1s. 2d. per lb. Ducklings: Home 7½d. to 8½d. per lb. Turkeys: American 1s. per lb.

*Bacon.*—The recent high prices have restricted business, but now there is a firm market with a good demand on account of the holiday requirements. Sides: Irish 70s. to 80s. per cwt., Danish 62s. to 79s., Swedish 68s. to 76s., Russian 48s. to 62s., Canadian 60s. to 71s., Dutch 72s. to 74s.

*Hams.*—The market is quiet but steady. Irish 92s. to 108s. per cwt., English 84s. to 104s., Canadian 68s. to 81s., American 61s. to 75s.

London, 2nd August, 1912.

The wool-sales have closed, with a good demand for all descriptions. The sales have not been affected adversely by the continuation of the strike. There was a good American demand, especially for crossbreds in good condition. Trade is good both



at Home and on the Continent, and prospects are favourable. 17,000 bales of New Zealand wools are held over. Estimated values realized: Superior merino 1s. to 1s. 2d. per lb., medium 9½d. to 11½d., inferior 7½d. to 9d., fine crossbreds, all grades, 1s. to 1s. 2½d. per lb., medium crossbreds 9½d. to 1s., coarse crossbreds 8d. to 11d.

London, 3rd August, 1912.

*General*.—The strike has terminated and work will be resumed.

*Mutton*.—The market is quiet but firm. Canterbury 3½d. to 4½d. per lb. according to quality, North Island 3½d. to 4½d.

*Lamb*.—The market is weakening, with signs of a decline. A large supply. Canterbury 5½d. to 6d. per lb., other than Canterbury 5d. to 5½d.

*Beef*.—The market is dull. New Zealand hinds 3½d. per lb., fores 3½d.

*Butter*.—The market is firm. There is a general active demand for best quality. The average price for the week for choicest New Zealand butter per cwt. is 116s., Australian 111s., Danish 128s., Siberian 108s.

*Cheese*.—The market is firm with more inquiry. New Zealand white 65s. 6d. per cwt., coloured 66s. 6d.

*Hemp*.—For New Zealand the market quiet at the advance. Spot: New Zealand good-fair grade £25 10s. per ton, fair grade, £23 15s.; forward shipment about the same price.

*Manila*.—Large business doing and prices are strong in the market. Fair current manila £25 per ton, forward shipment £26. The output from Manila for the week was 31,000 bales.

*Linseed*.—The market is quiet, prices slightly weaker. New Zealand, nominal value 65s.

London, 10th August, 1912.

*Mutton*.—The market is firm, with an improved demand for best quality. Light-weight carcasses are getting very scarce. Canterbury 3½d. to 4½d. per lb., North Island 3½d. to 4½d., River Plate 3½d. to 4d.

*Lamb*.—The market is steady and a fair business doing. There is a good demand for prime-quality lamb. Canterbury 5½d. to 6d. per lb., other than Canterbury 5d. to 5½d.

*Beef*.—The market is somewhat steady. New Zealand hinds 3½d. per lb., fores 3½d.

*Butter*.—The market is quiet but steady. There is a good demand for best quality of New Zealand, which is firmly held by second hands. Choicest New Zealand 116s. per cwt., Australian 112s. Danish 129s., Siberian 108s.

*Cheese*.—The market remains firm. New Zealand white 65s. 6d., per cwt., coloured 66s. 6d., Canadian, 1s. less, English cheddar 73s.

*Hemp*.—The market is firm at the advance. There is a better demand. Spot: New Zealand good-fair £26 per ton, New Zealand fair £24, fair current manila £26 5s. Forward shipment: August–October, New Zealand good-fair £26 per ton, fair grade £24 10s., fair current manila £26 10s. The output from Manila for the week was 25,000 bales.

*Mutton and Lamb*.—River Plate shipments received during the month of July, 1912:—

	Mutton. Carcasses.	Lamb. Carcasses.
London .. .. .	55,143	14,468
Liverpool .. .. .	175,962	55,796
Cardiff .. .. .	7,997	..
Hull .. .. .	8,000	..
Southampton .. .. .	8,807	999
Newcastle .. .. .	2,903	771
Plymouth .. .. .	..	597
Ireland .. .. .	197	31
	<hr/>	<hr/>
	259,009	72,662
July, 1911 .. .. .	230,071	58,438